

ARCHIVES OF OTOTOLOGY.

CHOLESTEATOMA OF THE EAR.*

By A. KUHN, OF STRASBURG.

Translated by Dr. HARRY FRIEDENWALD, of Baltimore.

With Plates III. (Colored) and IV. (Lithographic) of Vol. XXI. of German Edition.

CRUVEILHIER¹ was the first to describe cases of cholesteatoma, naming it "tumeur perlée." The term cholesteatoma was introduced by Johannes Müller,² who recorded eight cases. He believed that this tumor might occur in any part of the human body, and that it was always encapsulated by a thin membrane, which was not composed of cellular elements like the cholesteatoma, but of indistinct fibres. Müller describes the cholesteatoma as a tumor without blood-vessels, which grows like the yolk-cells within the yolk membrane and like the stratified epithelial cells. The cells which have been formed leave the seat of their formation, new cells constantly taking their place; this accounts for their stratified structure.

Cruveilhier regarded the growth as a product of secretion, because he could not find any indication of organization, and called it "tumeur perlée," because of its pearly white lustre. Müller, on the other hand, looked upon it as a pearly white, stratified *fatty tumor*, and therefore gave it the unsuitable name of "*cholesteatoma*," for he considered the *cholesterine* which is found between the layers of the polyhedral cells as essential and characteristic of the tumor, and as the differentiating feature from other fatty tumors (*steatomata*).

* Read before the Section on Otology at the Tenth International Medical Congress, August 5, 1890.

¹ Bibliography at the end of the paper.

Virchow,³ basing his observations upon a large number of cases of cholesteatoma (including two occurring in the temporal bone) questions this conception of cholesteatoma, of Müller. According to Virchow the cholesteatoma, which should more properly be called "pearl tumor," or "margaritoma,"¹ is an *epithelial neoplasm*, consisting of concentric lamellæ, made up of polygonal, flat, non-nucleated, epidermoid cells, between which cholesterine crystals lie in greater or less quantities. The pearly gloss is produced, as was already pointed out by Müller, by the interference of light in the finer concentric layers of the polyhedral cells.

Virchow regards the growth, whether occurring in the *pia mater*, in the temporal bone, or in other bones of the skull, as a *heteroplastic* formation, for under normal conditions epidermoid structures are not found in those parts. In this respect it differs from the atheroma, which otherwise resembles it both microscopically and macroscopically, it being likewise made up of concentrically stratified layers of flattened polyhedral epidermic cells, with cholesterine crystals between them. Atheromata, however, are never found but in parts where there are sebaceous glands and hair follicles, in which the epidermic pearls develop by simple hyperplasia. In order to consider cholesteatoma an analogous development we would have to suppose, as does Remak,² that epithelial cells became involuted in the *pia mater* or in the temporal bone during an early embryonic period. Virchow regards the heteroplastic development as *analogous* to that of the *epithelial carcinoma*; both develop from mesoblastic tissues.

Cholesteatoma is *most common*, according to Virchow, in the *temporal bone*, especially in the upper and outer portion of the tympanic cavity toward the cells of the mastoid process, in a part where at a very late period solid bone is gradually absorbed to make way for ivory-like bone containing air spaces communicating with the tympanic cavity—a process which is rare in other portions of the system. "It is possible that the development of epidermoid masses has some connection with this process." This hypothesis is, however, not justi-

¹ From *μαργαρίτη*, a pearl (Craigie).

fiable, inasmuch as these spaces, which develop at a later period of life by the absorption of the bone, exist as well in the normal temporal bone of the child as of the adult. These early smaller or larger cavities are the *recessus epitympanicus*, the *aditus ad antrum* which are found more or less developed in every temporal bone, and which are long known to be the favorite seat of cholesteatomata (Bezold). According to Virchow, the tumor is at first entirely enclosed in the bone, and it may remain so; but frequently it distends the bony cavity by its gradual growth, causes absorption of the bone (as an aortic aneurism does of the vertebræ), and finally perforates the bone into the tympanic cavity or the external auditory canal, or on the surface of the mastoid process, or into the middle or posterior cranial fossa, or even into both at the same time. The absorption of the bone may go on unnoticed, causing no marked symptoms. In other cases, however, inflammatory processes arise in the neighborhood, the bone becomes carious, the neoplasm usually becoming disintegrated at the same time. If this inflammatory process extends toward the tympanic cavity or the external auditory canal, perforation of the drum or of the canal occurs, and otorrhœa sets in. Should the extension be toward the cranial cavity, then the farther course will vary according to what part of the *dura mater* has been exposed. If it is, for example, the dural covering of the sigmoid sinus that is touched, sinus phlebitis and thrombosis may develop, with all the symptoms of pyæmia. At other parts of the *dura mater* it may produce meningitis, and even cerebritis.

Virchow describes as *capsule* of the cholesteatoma an exceedingly fine membrane, one of the most delicate structures that it is possible to see.

Such are Virchow's views and those of his school⁶ on the nature of cholesteatomata, and they are now universally accepted both by pathologists and surgeons.

Thus Mikulicz⁶ regards cholesteatomata and dermoid cysts as nearly related, and having intermediate forms to which the dermoids of the head belong. Both are embraced by the generic term of dermoid. He ascribes the frequent occurrence of cholesteatomata in the neighborhood of the ear

to the complicated development of the epidermoid structure of the labyrinth. The primitive auditory sac arises as an accumulation of epidermic cells near the posterior cerebral vesicle, which becomes involuted and sinks in deeply; processes may develop and be partially separated. The aqueduct of the vestibule remains as a vestige of its connection with the epiblast.

Küster⁷ also regards cholesteatoma of the ear as a primary tumor, as a congenital neoplasm of the bony middle ear of the same nature as the deep atheroma of the neck, the branchiogenic cystoma, both having their origin in detached involutions of epidermic elements in the region of the first branchial cleft.

Toynbee⁸ was the first otologist to record a case of cholesteatoma (1850). It occurred in a man aged sixty-seven years, who had shown no symptoms of ear trouble during life, was situated in the posterior wall of the auditory canal, and had extended from here into the mastoid cells; it was undoubtedly a cholesteatoma, though Toynbee called it "molluscous tumor," and erroneously considered it as having taken its origin in the sebaceous glands or hair follicles of the external auditory canal.

v. Troeltsch⁹ in 1868 opposed Virchow's theory of the primary and heteroplastic nature of cholesteatoma of the ear. He described four cases, explaining the epidermic masses as *products from the surface of the chronically inflamed mucous membrane of the middle ear, which are retained where they are formed and thus collect in great masses.* He therefore regarded them as *retention tumors.*

His reasons for regarding them as the products of a diseased mucous membrane and not as peculiar kinds were: 1, the flat arrangement of the cholesteatomatous masses; 2, their connection with the mucous membrane; and 3, the constant *presence of caseous pus* in the centre of the growth. This pus he regarded as the origin of the growth; by exerting gradual pressure upon the walls of the bony cavity—for instance, the *antrum*, the favorite seat both of old caseous masses and of cholesteomata,—it causes the "*formation of cellular products not only in great*

quantity, but changed also in form and kind so that they resemble *stratified epidermis* and appear as pearly plates."

A year later (1869) Nobiling¹⁰ raised the very weighty argument against Troeltsch's view, that the epidermic cells composing cholesteatomata of the ear cannot at all be compared with the epithelium found in the middle or inner ear. While the latter is made up of very small nucleated cells 0.03 mm in their longest diameters, and form a pavement epithelium, the former are non-nucleated, and are 0.06-0.09 mm in their longest diameters, being thus 2-3 times as large, and resemble the epidermic cells of the auditory canal in size, form, and in other qualities.

Notwithstanding this many otologists still cling to Troeltsch's view, which is incorrect both anatomically and clinically. It fails to explain those rare cases in which cholesteatomata appeared with very acute symptoms and without any preceding otorrhœa. It offers no reason for the fact that cholesteatoma occurs usually in one ear only, though suppurative inflammations of the middle ear frequently affect both ears. Moreover, the central nucleus of pus is wanting in very many cases; the tumors are frequently composed *throughout* of the same pearly epidermic plates, and even when a so-called pus-nucleus is present, it is found to be composed of disintegrated epidermic cells, together with particles of fat and cholesterine crystals and not of caseous pus,—there being no vestiges of either new or old pus cells. Finally this theory does not explain why the cavities of the middle ear containing the cholesteatoma, be they large or small, are provided throughout with a thin, white, glossy lining, (unless the wall has become carious), consisting of a thin layer of connective tissue, which is closely applied to the bone and of four to six layers of cells, which are perfectly analogous to the *rete Malpighii*, and which pass gradually over into the flat polygonal cells of the cholesteatoma. The surface of the cholesteatoma lies in close contact with this membrane, by which it is produced. Irritation by pressure is unnecessary in this production, as is proved by the many cases in which, after removal of the masses, new products soon appeared.

Wendt¹¹ also opposed v. Troeltsch's theory. He described (in 1873) a true cholesteatoma, but believed that these growths are very rarely primary neoplasms. He inclined to the view that cholesteatomata of the middle ear are commonly the *product of a desquamative inflammation of the tympanic mucous membrane*, which when exposed by perforation of the drum after chronic inflammations, may take on the character of the external skin with even a *rete Malpighii*, and, shedding the outermost flattened layers rapidly, may give rise to cholesteatoma. Moreover, Wendt states he has seen a case in which the *rete Malpighii* of the external skin at the edge of a perforation in the drum passed directly over into the newly formed layer in the tympanic cavity. This may explain the production of cholesteatomata, but not the formation of the cutis-like lining membrane. Besides, the theory requires a more or less extensive perforation of the drum, which is not always found. We have occasionally removed such formations similar to cholesteatoma from the mucous membrane on the promontory, but they were always only thin, lamellated, epithelial scales, and never the thick, concentrically stratified masses of a cholesteatoma. Another argument against Wendt's theory is that the *antrum* and the *aditus ad antrum*, the favorite seats of cholesteatomata, have but very slight communication with external parts, even when Schrapnell's membrane is perforated. Moreover, it is very remarkable that in a great number of cases of perforation of the drum, with exposure of the middle ear, the mucous membrane retains its normal character.

Lucae,¹² struck by the almost constant occurrence of granulations in cases of cholesteatoma, believes that the former stand in a causal relation to the latter. Ponick observed that in a case of granuloma its periphery consisted of characteristic epidermic cells, which had developed from the granulation-cells by the latter gradually becoming larger and flatter. Lucae therefore believes that many cholesteatomata arise from proliferation and shedding of epidermis from granulations in suppurative inflammation of the middle ear, and that this accumulates in the spaces within the middle ear finally forming a cholesteatoma. This explanation

is also insufficient because it does not account for the membranous capsule.

Both Politzer¹³ and Lucae concede that cholesteatoma may also develop as a primary growth. The latter described such a tumor in 1866; it was found in a person who had died from spinal disease and completely filled the middle ear, appearing as a yellowish-white pearly tumor of the size of a cherry. At the same time the drum, though somewhat hazy, did not show any break in its continuity, nor were any signs of inflammation or of suppuration visible in any part of the temporal bone.

Besides this rare and very important observation, Lucae records another case in which a cholesteatoma of the tympanic cavity perforated the upper posterior quadrant of the drum membrane, giving rise to very acute symptoms. The patient, aged forty-four years, was unable to remember any previous trouble in this ear.

Similar cases of cholesteatoma, whose appearance was accompanied by very acute symptoms, and which were not preceded by any affection of the ear, have been recorded by myself,¹⁴ and Schwartze¹⁵ also mentions a case with perforation into the auditory canal without previous inflammation or suppuration. Urbantschitsch ("Lehrb. d. Ohrkr.", 1890, p. 288) also observed a case in which the upper posterior quadrant of the imperforate drum was pressed far forward by a large growth arising in the tympanic cavity. After incising the drum it was found that the upper and posterior part of the tympanic cavity was filled with a cholesteatomatous mass. This patient had likewise never had any previous affection of the ear.

Habermann¹⁶ and Bezold¹⁷ have recently published anatomical facts, which are in accordance with the theory of secondary development of cholesteatomata of the ear, and which are the most weighty objections that have until now been raised against Virchow's views. In 1888 Habermann described one case, and in 1889 two further cases, before the *Heidelberger Naturforscher-Versammlung*, which yield unquestionable anatomical proof. In the first case a band-like strip of epidermis extended from the external sur-

face of the perforated drum membrane, through the perforation and over the fenestra ovalis to the cholesteatoma situated in the antrum; in the second case the epidermis and the mucous membrane had grown in a similar manner from a perforation in the upper posterior quadrant of the drum into the tympanic cavity and here encapsulated a globular cholesteatoma, which filled up the greater part of the tympanic cavity. The third case gave similar evidence, though much less clearly.

Thus Habermann explains one manner of origin of cholesteatomata, though he considers it possible that they may develop as a purely hyperplastic growth in the middle ear or even as a metaplasia of the tympanic epithelium. Bezold, who recently advanced similar views, observed these growths with exceeding frequency in cases of chronic suppuration with perforation of Schrapnell's membrane, and often too in cases of chronic purulent inflammation of the middle ear in which fistulous openings had appeared in the external auditory canal or on the cortical surface of the mastoid process. In all these cases the development of epidermis can be demonstrated anatomically in the middle ear; here heterologous tumors are of exceedingly rare occurrence—a fact which is not in consonance with the relative frequency of cholesteatoma of the ear. According to Bezold, simple tubal catarrh may cause retraction and perforation of Schrapnell's membrane, and this may lead to extension of the epidermis and to the formation of a cholesteatoma in the *aditus* and the *antrum*.

The structure of the fine membranous capsule seems to me to be of the greatest importance in the mode of origin of cholesteatomata. I have recently had an opportunity of removing this membrane, together with the bone, from a living patient, and of examining it microscopically.

C. S., fifty-one years of age, had always enjoyed good health. Until a year ago his hearing had been very good in both ears,—there had never been a discharge. About a year ago he first noticed a pretty intense tinnitus, which came on frequently, especially after violent physical exercise, and at these times the hearing of this ear diminished. Later on attacks of dizziness would

accompany the tinnitus and recur about every fortnight, getting more severe with each attack ; his vision would become much impaired, he would stagger and would have to hold on to something to prevent himself from falling. When he pressed his finger against the left mastoid process the dizziness would increase considerably. In January he had had influenza without affecting the auditory apparatus.

His condition remained unchanged until March. On the 19th he took a bad cold, from long exposure in wind and snow ; in the evening of the same day severe pain set in in the deeper parts of the left ear, which increased during the following night ; on the next day he was unable to work because of great pain and fever. Two days later a purulent discharge appeared in the left external auditory canal, but the pain continued. On the fourth day the skin covering the mastoid process became swollen ; the fever rose, and the discharge was very abundant and exceedingly offensive. On the sixth day the side of the neck became red and swollen. On the eleventh day the patient was admitted into the clinic.

March 30, 1890.—Pain great ; temp. 39.5° C. The right ear is normal. There is a profuse discharge of thin, very offensive, greenish pus, which escapes through a fistula situated about 1 cm from the drum in the protruding posterior wall of the auditory canal. Only the anterior lower quadrant of the drum can be seen, and this is covered with smeary pus. On removing this we exposed a small slit-like perforation in the anterior and inferior part of the drum, through which the patient is able to force a small quantity of pus, together with air. The mastoid process is red and swollen ; somewhat behind the upper border of the auricle there is a soft spot with deep, hard edge (1 cm in diam.), which presents deep fluctuation. The skin covering the tip of the process is also red and swollen, and below this there is a hard sausage-like infiltration of the deeper parts of the neck beneath the sterno-cleido-mastoid muscle. On pressing on the spot on the mastoid where fluctuation is felt, pus is forced out in great quantities. This contains dirty-yellow lumps of the size of a pea or a bean, which the microscope afterwards reveals to be pieces of a cholesteatoma. The hearing of the right ear is normal. For the left whispered words and Politzer's acoumeter = 0. Weber's experiment shows increase of the sound in the left ear. There is entire loss of air-conduction.

Operation on the following day. After incising the densely infiltrated skin, a large opening was found in the upper part of the process. The edges were carious and rough and covered with some discolored granulations. Offensive greenish pus escaped through this opening. On attempting to use chisel the whole outer wall of the process down to the tip broke in and was removed with the forceps.

It was then evident that the whole of the process was filled with a white, glossy, dry, cholesteatomatous mass, which broke into many pieces in its removal; the upper anterior parts were discolored and had undergone purulent disintegration; the other parts, including those in the centre, were pretty dry and white. The whole mass was at least of the size of a large hen's egg. The only part of the mastoid process which remained was the very tip. The cavity extended forward, laying the articulation of the inferior maxillary bone perfectly bare; the lower and the posterior walls of the auditory canal had disappeared; the inner plate of the process was also wanting, exposing the uninjured dural covering of the anterior inferior segment of the cerebellum, which protruded several *cm* into the cavity and showed strong pulsation. Pieces of cholesteatoma were removed from the *dura mater*; the latter was of a dull-grayish color, appeared to be considerably thickened, but was not inflamed or injured at any point.

The cavity was washed out with a 1:4000 sublimate solution, the fluid escaping through the fistula in the auditory canal. Dressing of iodoform gauze. Hemorrhage was moderate. In the evening the temperature had fallen to 38.5° C., remained so for two days and then became normal and remained so. The intense pain of which he had complained before the operation disappeared entirely, but whenever the dressing was changed during the first three weeks he would regularly have attacks of dizziness or even of fainting. During this period he also suffered with persistent insomnia, which could only be remedied by subcutaneous injections of morphine. After the first three weeks had passed he improved rapidly. The large cavity discharged profusely for many weeks, and it was not before the end of July that the patient could be discharged.

At this time the cavity had diminished to almost half its size. The movements of the jaw were still visible, but were much less evident than at first, for the articular surface was covered with dense and strong connective tissue. The pulsation of the cere-

bellum could still be seen slightly. The *dura mater* was very much thickened and covered by a glossy white membrane, which likewise lined the whole interior of the cavity. Suppuration had ceased almost entirely. Iodoform gauze placed in lightly, and a plate of hard rubber externally, protected the cavity.

The external auditory canal was of normal calibre and perfectly dry. The fistula had closed. The perforation in the anterior inferior quadrant of the drum had closed a few weeks after the operation and remained so. The drum membrane itself was of a grayish-red color without lustre and thickened. No cicatrices or perforations were visible. Schrapnell's membrane was normal. The hearing distance of the left ear for whispered words was 3 cm (July 27th).

The tumor that was removed had the characteristic pearly-white gloss and was composed of large polyhedral epidermic cells without nuclei. Disintegrated matter was found only in the upper anterior portion ; in the centre even cholesterine crystals were entirely wanting.

The piece of bone that was removed was irregularly quadrilateral, about 3 cm square and 2-3 mm thick. Its inner surface was covered with a dense white and very glossy membrane. Two small pieces were taken from the periphery and decalcified.

Their *microscopical examination* shows that the bone contains small and large spaces (Fig. 2), which are partially filled up by dense connective tissue. The periosteum, which is closely attached to the bone, is made up of two equally thick membranes, a periosteal membrane, and an epidermic membrane (Figs. 2 and 3). The former consists of three layers ; the two nearest the bone are periosteum proper, the third has the character of a cytogenic membrane. The layer nearest to the bone has scarcely any blood-vessels, and is characterized by the great network of elastic fibres of which many bundles dip down vertically into the bone (Sharpey's bundles) (Fig. 3) ; there are also a few scattered round or flattened cells to be seen.

The second periosteal layer is intimately connected with the former. It contains many blood-vessels, and consists of bundles of connective tissue woven together in various directions, but having a somewhat parallel course ; the vertical fibres mentioned above are not to be found in this layer.

The third, the cytogenic membrane is closely attached on the one side to the second periosteal layer and on the other to the

epidermic membrane. It consists of parallel fibres with many round cells, which form the characteristic feature of this layer.

The epidermic membrane is composed of the same elements as the outer layers of the skin, the *rete Malpighii*, and the horny layer. The former is made up of several layers of closely attached cells with granular protoplasm and a light round nucleus (Fig. 3); those lying upon the cytogenic membrane have a lengthened cylindrical form; upon this there are three to four layers of round prickle cells; finally there is a single or a double layer of lengthened cells which take on an intense color when treated with carmine (Eleidine cells, *stratum lucidum*).

The horny layer is composed of light homogeneous cells, the inner layers of which still show a large round light nucleus, which disappears toward the outer layers.

REMARKS.

The question in this case is whether the cholesteatomatous growth was a "true neoplasm," or whether it had its origin in epidermoid tissue of the drum membrane, or the external auditory canal, which had extended into the tympanic cavity, or the cells of the mastoid process, and then proliferated.

The perforation in the drum was situated in front and below, and was therefore very distant from the seat of the growth; it is improbable that there was any connection. The opening was, moreover, only as large as a pin's head at most, and very little pus escaped through it, showing that it was not in direct communication with the main lesion. This makes it appear improbable that epidermis should have extended in from the drum. It is equally improbable that it had grown in from the fistulous opening, situated in the anterior wall of the mastoid process. This would have been possible only after profuse otorrhœa of long duration, for without it perforation of both bone and skin seems impossible. The patient, however, stated positively that no pus had ever been discharged from the ear before the 19th of March, or ten days before the operation, that he had never had any affection of the ear even in his youth, and that he had always had good hearing in that ear until about a year before.

The clinical symptoms, moreover, favor the view that this was a case of "true cholesteatoma," that it was a tumor which originated *primarily* in the mastoid process, and which had during many months and perhaps years grown to its tremendous dimensions; the symptoms which appeared during the last year (tinnitus, dizziness, deafness) were due to erosion of external portions of the ear and to pressure on the cerebellum. Exposure on the 19th of March caused the acute symptoms of the inflammation and of the disintegration of the tumor, which had then extended to the posterior wall of the auditory canal.

The presence of a membrane lining the bony cavity is not proof of the primary origin of the tumor, for it may have been due to the pressure of the tumor upon the periosteum and the bone. At the same time, we have confirmed the observations of pathologists as to its existence.

A great number of valuable clinical observations have been published by Moos, Schwartz, Küpper, Kirk, Dunkanson, Kipp, Steinbrügge, Hessler, Katz, Schmidt, Miehle, and others, which have increased our knowledge of the symptomatology and the complications of cholesteatomata, and have even added to our therapeutic measures, but they do not bear upon the question we have discussed—the anatomy and the origin of the tumor,—for they all agree with one or another of the older theories which we have had to discard.

Viewing the question from all sides, it seems at present to be reduced to one of two possibilities. Cholesteatoma of the temporal bone is either a TRUE HETEROPLASTIC NEO-PLASM, as Virchow believes it to be in all cases, or it may also develop and perhaps IN MANY CASES, in the course of chronic suppuration of the middle ear, from epidermis which has grown into the tympanic spaces from the perforated drum or the external auditory canal, and which has slowly and continually kept shedding its horny layer, thus forming the stratified cholesteatomatous mass.

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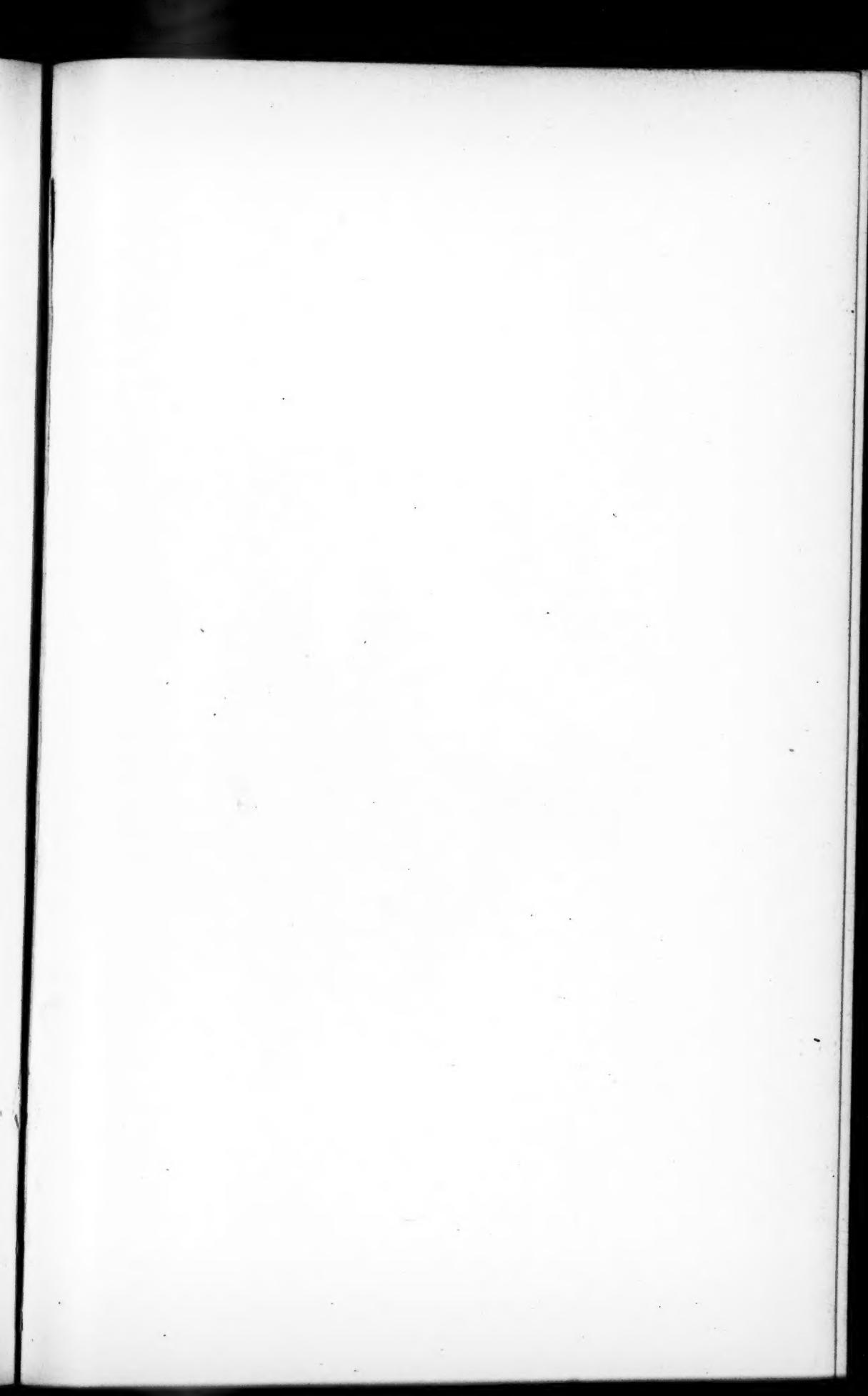
Description of Plates.

FIG. 1.—*a* and *b* (natural size) show cavity in the mastoid process fourteen days before the patient was discharged. The depth can be seen in the cross-section figured in *1 b*. At a few places granulations are still visible on the white-lining membrane.

FIG. 2.—Cross-section. Bone showing large and small spaces, partly filled by connective tissue. Periosteum; *rete Malpighii*; horny layer. Hartn. $\frac{3}{4}$.

FIG. 3.—Cross-section of detached periosteum and capsule, with some remaining cholesteatomatous particles. Hartn. $\frac{3}{7}$.

FIG. 4.—Polygonal cells, with nuclei from the horny layer of Fig. 3. Hartn. $\frac{3}{7}$.



Karl Schneider, 51 Jahre alt.

Fig. Ia



K. Scharfenberger, gez.

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Fig. II.

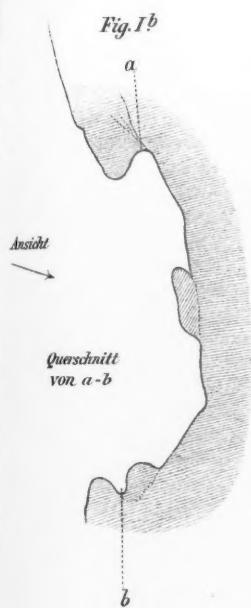
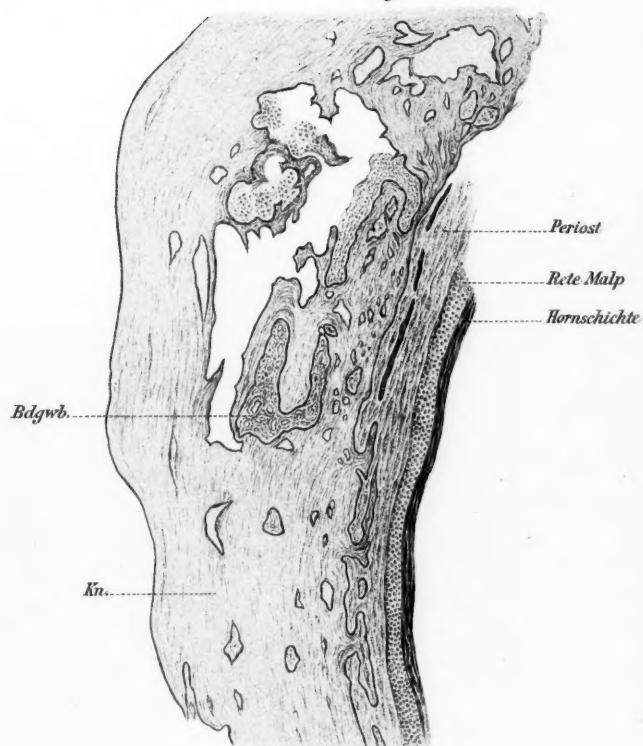


Fig. III.

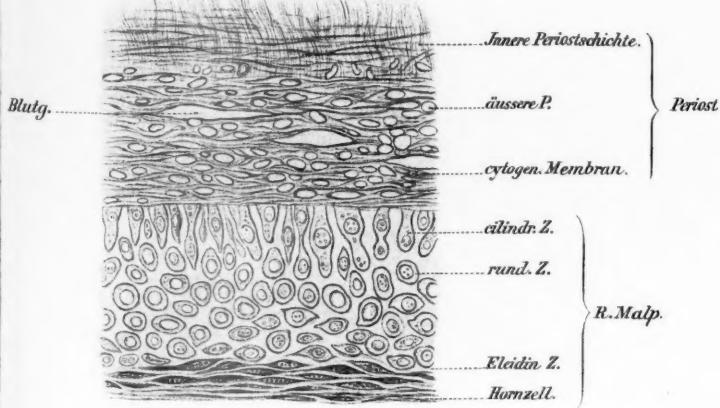
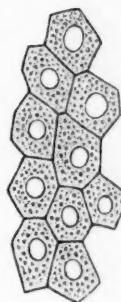
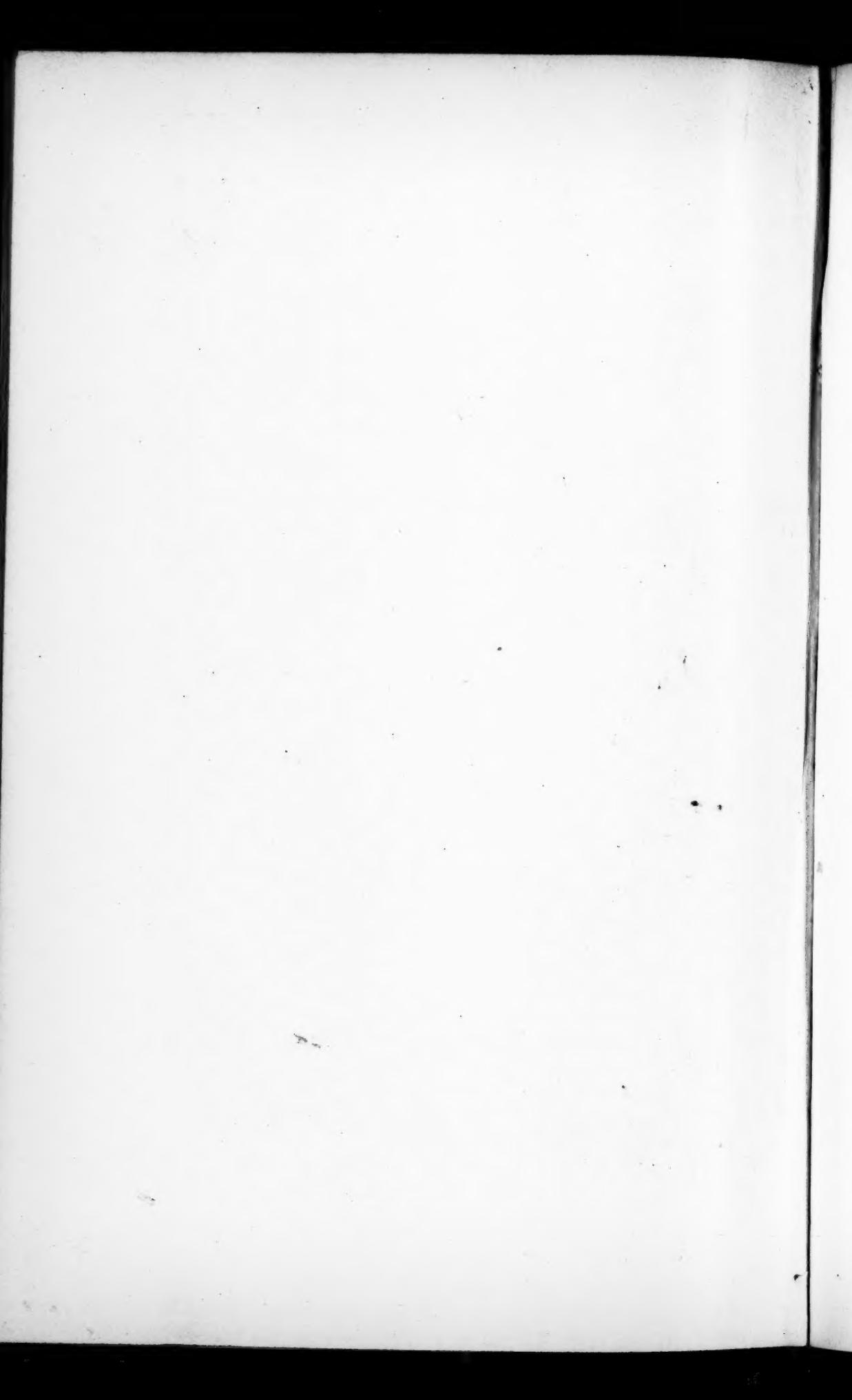


Fig. IV.





THE TREATMENT OF CHOLESTEATOMA OF THE MIDDLE EAR.¹

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Translated by CHARLES H. MAY, M.D., New York.

THE following table represents a survey of the results of therapeutics in cases which occurred in my own practice:

Form of Disease of Middle Ear.	Otorrhœa ceased.	Otorrhœa persisted.	Seen but once or but seldom.	Result unknown after continued treatment.	Came under ob- servation as dry perforations.	Died.
Perforation of Schrapnell's membrane.	{ 37. 50.0 %	{ 6. 8.1 %	{ 16. 21.6 %	{ 10. 13.5 %	{ 4. 5.4 %	{ 1. 1.4 %
Cholesteatoma.	{ 25. 43.9 %	{ 12. 21.1 %	{ 11. 19.3 %	{ 6. 10.5 %	{ 3. 5.3 %	

The only case of death occurred in a patient who had meningitis when brought to the hospital, and who died two days after admission, opening into the antrum having been attempted.

According to this table, the results in general do not seem to have been more unfavorable than those attending the treatment of simple chronic purulent otitis complicated with granulations.

There is, however, a great difference in the *duration* of

¹ From a paper read before the Otological Section of the Tenth International Medical Congress, held at Berlin, August, 1890.

the affection just mentioned as compared to that of the two forms we are considering. We are accustomed to see a return of the trouble in a fraction of the former cases; but in the latter, this is the rule; and in the cases put down in the table as cured, I would not want to assert that more than a majority will remain cured.

A considerable number will remain cured. If the cavity is rendered free by a large opening into the wall of the canal or of the mastoid process, not only does suppuration cease but also all hyper-production of epidermis; the lining of the cavity then resembles the outer layer of the skin and all accumulation of secretion ceases.

In forty-seven cases of cholesteatoma such a result occurred

8 times between the ages of 2 and 9 months.

4	"	at	"	age	"	1 year,
twice	"	"	"	"	"	3 years,
once	"	"	"	"	"	5 "
and	once	"	"	"	"	9 "

In the first case published by me,¹ this cessation in the production of epidermis has now been observed thirteen years.

However, such an absolute cure, especially when perforation of Schrapnell's membrane has occurred, is the exception and not the rule; the majority of cases require looking after for many years or even throughout the entire course of life, in order to prevent a reaccumulation of epidermis and its consequences.

Therapy has gradually become developed and completed within the last decade, keeping pace with our knowledge of this disease in general; difficulties in treatment increase proportionately as the inaccessibility becomes greater than in other purulent affections of the middle ear.

More than half the cases are complicated by polypoid granulations, usually exposed by pressure from the cholesteatomatous masses which act as foreign bodies. Only a portion of the granulations is found in the canal; the

¹ *Archiv f. Ohrenheilk.*, Bd. xiii., S. 31. (Fall II.)

greater part is found at the margin of the perforation, especially where this is formed by bone, in the cavity, around the ossicles, etc.

On this account it is frequently impossible to remove all the granulations with the snare. In seven cases of perforation of Schrapnell's membrane I succeeded in exposing and tearing off granulations as large as peas, which had previously been hidden, by a strong, direct injection into the cavity by the use of the tympanic tube. In addition we may use the sharp spoon of Wolf or strong curettes, etc., which instruments also serve to scrape the carious bone.

After years of observation we notice the gradual disappearance of these bony margins often enough; if the opening be of sufficient size and the contents be removed, the production of epidermis generally ceases. This fact furnishes us with a guide to treatment.

In most of the cases it was inflammatory manifestations in the mastoid region, but in a few it was an obstinate persistence of fetid otorrhœa, which induced me to open the mastoid antrum—in three cases of perforation of Schrapnell's membrane and in the nine cases of cholesteatoma. In two of these cases it was necessary to make three openings in the course of the year; in one case four repeated openings were necessary. *The previous perforation canal was found in each case beneath the soft parts,¹ and the masses of epidermis had in part proceeded outward into the canal underneath the soft parts.* Even a healed perforation canal, therefore, serves as an escape for the pressure from an aggregation of masses of cholesteatoma; this would at least be sufficient to prevent this pressure from being exerted towards the cavity of the brain. Only in a single case, the fatal one, did we fail to reach the antrum; the canal, which ran directly under the antrum, terminated in a blind extremity in the temporal bone, as shown by the autopsy. In all other cases the antrum was reached, and generally large masses of concentrically arranged epidermis, of cheesy matter, and of granulation tissue, could be removed. In a number of times the

¹ Ferrer has observed this same occurrence; these ARCH., vol. xvii. (1888), p. 317; cf. Zeitschr. f. Ohrenheilk., Bd. xx., S. 245.

main part of the mass became dislodged in one piece as a result of possible injection during the operation.

Accidental injuries, such as we would almost necessarily expect in a number of the cases when we examine the relations of the sigmoid sinus and middle fossa, did not occur.

Later on, after the process has lasted many years, we find mastoid processes which are almost completely sclerosed, containing often no other space except the antrum, more or less dilated; this absence of cell spaces is, however, the result of long-continued inflammatory and irritative processes.

The treatment of both conditions has been furthered by the introduction of the operation of excision of malleus and incus as recommended for cholesteatoma by Kessel as early as 1879, and as employed with special frequency by the Schwartz school since then. By operating in this manner we are often able to expose the cavity sufficiently from the auditory canal.

In the 112 cases the malleus, generally carious, was extracted 10 times—5 times in cases of perforation of Schrapnell's membrane and 5 times in cases of cholesteatoma. This operation was only done in cases in which the whisper was heard at less than $1\frac{1}{2}$ metres. It was probably accidental that the incus was not included in any of these 10 cases. In 4 cases it was necessary to open the antrum at the same time.

Regarding the rest of treatment, it seems absolutely necessary to me to use Hartmann's or some other form of tympanic syringe in all cases, not only therapeutically, but also for the purpose of diagnosticating the existence of cholesteatomatous masses. It is only with the assistance of a direct stream, led into the cavity by a short route, that we are able to loosen and remove the scales of epidermis adherent to the widely dilated walls of the cavity. The injection consisted of a four-per-cent. solution of boric acid. When preliminary softening seemed necessary, liquor ammoniæ, considerably diluted, was used.

When the size of the cavity admitted, I used a sharply bent tympanic tube of large calibre for direct insufflation of boric acid; this method I have been using since 1877, and

with increasing practice I have found it serviceable in an increasing number of cases. In order that this method of treatment may be correctly applied, it is necessary that the entire cavity be dried carefully previous to the insufflation; this can best be done by cotton wound upon a holder, the latter being bent as required. Gomperz and Siebenmann also have recently reported favorably upon the insufflation method. In a series of cases, among which were some in which the antrum had been opened and the malleus extracted, several insufflations into the cavity stopped the suppuration and produced a lasting cure of the fetor; this method of treatment grew constantly in favor, so that now I employ it in every possible case. In the rare cases in which boric acid produces eczema of the auditory canal I use iodoform.

We appreciate the full value of one of our oldest therapeutic resources when we consider the probability of an etiological connection between catarrh of the tubes and perforation of Schrapnell's membrane and cholesteatomatous formations. The certain control of catarrh of the tubes in children, which Politzerization and the removal of adenoid vegetations accomplish, may also be regarded as prophylactic measures against the development of many a case of cholesteatoma. In this way we may accomplish the greatest triumph—one to which medicine in general aspires,—to cure, in their earliest stages, a series of important ear diseases which, if left alone, are frequently followed by disastrous consequences on the general system.

A CASE OF DEAF-MUTISM CAUSED BY MEASLES, WITH POST-MORTEM EXAMINATION.

BY DR. HOLGER MYGIND, COPENHAGEN, DENMARK.

The deaf-mute C. F. V. J. was born October 31, 1863, in the town of Nyborg, Denmark. His parents, who are both alive, were quite healthy. There is no consanguinity between them, neither are there nor have there been any cases of deaf-mutism, deafness, or any other disease of the hearing organ amongst their relations, nor any case of idiocy, cerebral disease, or any other disease which experience has proved to be of any importance in the etiology of deaf-mutism. The parents have always lived under tolerably good conditions, and the father is not intemperate. There are altogether five children by this marriage ; of these the deaf-mute in question is the eldest ; the other children, four daughters, are all healthy, and their hearing is normal.

Carl J. was born at time by natural labor. The father was then twenty-nine, the mother twenty-two years of age. He was perfectly healthy during the first years of infancy, and developed well ; the parents are perfectly certain that his hearing was then normal, and that he began to speak like other children when about one year old. In one of the early spring months in the year 1865, when he was a little over one and one-fourth years of age, while the parents had their place of residence in the town of Vejle, the child was attacked by a disease which the medical attendant declared to be measles. The child was but slightly attacked, and kept his bed a few days only ; but the parents soon discovered that the child's hearing had meanwhile totally disappeared, never to be recovered ; there appeared at the same

time an abundant purulent discharge from both ears. They cannot remember if the child had any earache or other symptoms from the ear ; they did not notice any dizziness or derangement of equilibrium when the child walked. They know for certain that there were no cerebral symptoms present, such as stupor, convulsions, squinting, etc., nor any spinal symptoms.

Carl J. soon left off speaking, but was otherwise after recovery perfectly healthy, except that the discharge from the ears continued ; it was sometimes very abundant, while at other periods it was but slight, or did not even appear at all. It was frequently accompanied by a foul smell. After the child had been sent to the Deaf and Dumb Institution, the discharge discontinued and never appeared again. In the years subsequent to the appearance of the deafness, the child throve very well, never having any ailment of importance. His mental development was also satisfactory.

In 1872 the deaf and dumb child was sent to the Royal Deaf and Dumb Institution in Copenhagen, and there it was noticed that he had no faculty whatever of hearing or speaking. He was instructed by means of dactylography. The register of the institution does not contain any information as to the deaf-mute beyond what is stated above.

In 1879 the deaf-mute left the institution after having been confirmed there, and became apprenticed to a joiner. He showed, however, very little inclination to work, and his parents had therefore to take him home and maintain him until shortly before his death. Occasionally he left his home for shorter periods and kept bad company. He enjoyed good health and never kept his bed, but complained now and then of severe headache. By degrees he became more and more addicted to drink, and grew very irritable. Three weeks before his death he left his home, being dissatisfied with it and with his relatives' appeal to him to work, and the parents did not know anything about his death and intended interment until I had found out—after several days of close search—who they were, and had informed them of what had happened to their son.

On the 26th of January, this year, the deaf-mute was found by the police in one of the streets of Copenhagen, lying in a helpless state. He was conveyed to the Third Department of the Copenhagen Commune Hospital (Prof. Trier), where the medical officer in attendance found him in an almost dying state. The deaf-mute was, however, able to write his name and the address

of an ill-reputed lodging-house, where he had spent his last nights, and also that during the last three days he had had pains in the chest, cough and vomiting. By the medical examination there were found signs of a croupous pneumonia of the inferior lobe of the right lung. The deaf-mute expired the next morning at six o'clock.

The post-mortem examination was performed the 28th of January, by Dr. Borch, and revealed a genuine pneumonia of the inferior lobe of the right lung, but otherwise nothing abnormal in the thoracical and abdominal cavities.

AUTOPSY.

Both temporal bones were examined by me while fresh, on the very day of the post-mortem examination and the next, with the following result :

Right Temporal Bone.

The right temporal bone does not show any anomaly as far as shape and size are concerned ; the mastoid process is, however, a little less developed than normal. The petrous portion of the bone shows fully developed cerebral depressions. *Eminentia arcuata* very prominent. The external openings of the aquæductus cochleæ et vestibuli are present and of normal diameter. A fine probe introduced into the aquæductus cochleæ shows that this canal is impermeable a few *mm* from the external opening, while the aquæductus vestibuli allows the probe to pass through in its whole length.

The *mastoid process* is entirely built of hard, sclerotic, bony tissue, and there is no trace whatever of any cavity.

The *meatus auditorius externus* is of normal shape, length, and diameter. The *membrana tympani* is present in its whole extension, and movable by means of exhaustion and compression of the air of the meatus. The portion of the membrane situated in front of the malleus is of a whitish, tendinous appearance, and is not transparent, even after the removal of the dermoid layer ; the greater portion of the part of the membrane situated behind the manubrium is occupied by a large calcareous deposit (5 *mm* high and 3 *mm* broad), which is rather thick, especially in its centre, and is situated in the middle layer of the membrane. While the outer layer of the membrane is easily detached from the deposit,

the mucous layer adheres strongly to it. The malleus is present ; its manubrium is drawn considerably inwards and backwards, and the processus brevis is very prominent, without, however, producing any folds of the membrane. Schrapnell's membrane is normal.

The *tympanic cavity* is large, lined all over with a fine, thin, and pale mucous membrane, which nowhere forms any abnormal folds or adhesions. The opening to the mastoid cavity is obliterated, while that of the Eustachian tube is normal. All the ossicula auditus are present, and of a natural shape and size, and all their articulations are movable. The articulation between the base of the stapes and the *fenestra ovalis* is of normal aspect, but only a very slight movement is possible in this joint. The *fenestra rotunda* does not exist at all, the part of the inner wall of the tympanum situated behind the promontory forming a surface where there is not even a trace of *fossula fenestræ rotundæ*. This whole surface is very uneven, having numerous larger and smaller prominences, of which some are pointed and thorny, while others are nodulated and warty, the whole assuming the appearance of stalactite formations. The *eminentia pyramidalis* is not present ; its place is indicated by a small conic protuberance on the posterior wall of the tympanum. No trace of the *musculi tensoris tympani* or *stapedis* is to be found.

The *semicircular canals* are all present, and of natural length and curvature ; their diameter is $1\frac{1}{4}$ mm. They are all permeable in their whole length, and filled by a clear watery fluid of exactly the same appearance as the normal *aquæductus labyrinthi*. There is no trace of the membranous contents of the canals, the walls of which are perfectly smooth.

The *vestibule* is of natural shape and size, the *cresta vestibuli* and the *eminentia pyramidalis* being, however, less prominent than usual. This cavity does not either contain any membranous formation, but is filled by the same clear fluid as the semicircular canals. The base of the stapes is normal. The internal opening of the *aquæductus vestibuli* is rather wide. The opening to the *scala vestibuli* is normal.

The *cochlea* is that portion of the labyrinth which shows the most prominent anomalies, the greater part of its cavity being replaced by hard, white, sclerotic bone tissue, which, however, only indistinctly shows the normal outlines of the cochlea passing without any distinct boundary into the adjacent spongy bone of

the petrous portion. There is no trace of the modiolus, nor of the lamina spiralis. The first half of the first turn is all that is left of the normal cavities of the cochlea, forming a canal 15 mm long and 2½ mm wide, which, according to its position and size, represents scala vestibuli as well as scala tympani, without, however, being in communication with the tympanum through the fenestra rotunda. The remaining part of the cavity of the cochlea is filled with the same clear fluid as the semicircular canals and the vestibule. No trace of any membranous formation is to be found in cochlea, the cavity described being lined with a thin layer of periosteum, which adheres to the adjacent bone.

The *meatus auditorius internus* is of natural diameter, and contains the two nerves—the auditory and the facial. This latter takes its course through the Fallopian canal. The auditory nerve branches off in its two terminal branches—*nervus vestibuli* and *nervus cochleæ*—the terminal network of which ends in the bone itself, which forms the bottom of the meatus, and which looks natural except that the outlines of the *tractus spiralis foraminulatus* are not distinct, and that all the fine canals of the cribiform lamina do not lead into the labyrinth.

Left Temporal Bone.

This exhibits the same aspect as the right temporal bone in every respect.

The *meatus auditorius externus* is of normal shape and diameter. Its entire osseous portion is filled by a whitish, gelatinous mass formed by aggregated epithelial masses, after the removal of which the *membrana tympani* is seen to be almost entirely wanting.

The *tympanic cavity* is filled with the same gelatinous masses which were found in the meatus; after their removal all the *ossicula auditus* are seen to be present, being of normal shape and size, and movable in their articulations. *Malleus* adheres with its *processus brevis* and *manubrium* to a small rest of the *tympanic membrane*. The base of the *stapes* is only very slightly movable in the *fenestra ovalis*. The left tympanum is otherwise quite like the right; especially there is no trace of the *fenestra rotunda*, and the same stalactite formations are found on the internal wall of the cavity.

The *semicircular canals* and the *vestibule* are as on the right side.

The *cochlea* only differs from the right one inasmuch as the remaining part of the first turning is somewhat smaller.

The Auditory Nerves.

The nerve of either side is of natural volume and aspect, and its consistency is also normal. A microscopical examination (Dr. Borch) does not reveal any pathological changes, especially no signs of atrophy.

The Brain.

The meninges are filled with blood to a moderate extent; the pia and arachnoidea are easily detached from the surface of the brain. The meninges present no abnormality. There is no visible asymmetry of the two hemispheres, except that the posterior and inferior part of the frontal convolutions of the left side are slightly flattened, while the corresponding parts of the right side show more numerous and more branched sulci cerebrales. The examination of the brain reveals no other abnormality.

The Larynx

is normal.

The case of deaf-mutism described above is of interest inasmuch as post-mortem examinations of deaf-mutes are rarely reported in connection with complete information as to the origin of the pathological conditions which have led to deaf-mutism. It has therefore frequently been difficult to ascertain whether the morbid changes found in many cases of post-mortem examinations of deaf-mutes have been congenital or acquired—a fact I have pointed out in a previous paper.¹ The case is also of considerable interest because there only exist two previously reported cases of post-mortem examinations of deaf-mutes where measles were the cause of the deafness. The specimens of these two cases are in the pathological collection of the Copenhagen University, and are briefly mentioned by me in the paper quoted

¹ Mygind: "Uebersicht über die pathologisch-anatomischen Veränderungen der Gehörorgane Taubstummer." *Arch. f. Ohrenheilk.*, Bd. xxx., pp. 76-118.

above.¹ In one of these cases the cochlea was found in a condition similar to that of the present case, its normal cavity being perfectly replaced by bony substance, the aspect of which was exactly like that of the case reported here.

It is generally admitted that measles play some rôle in the etiology of deaf-mutism, although its importance in this respect is not nearly so considerable as that of scarlet-fever. Thus, Mygge² found in 1879, by investigations in the Royal Copenhagen Deaf and Dumb Institution, that none of the inmates admitted up to that time were reported as having become deaf through measles.³ L. W. Salomonsen⁴ found, however, some years later, that 11 out of 197 inmates with acquired deafness admitted to the said institution, *i.e.*, 5.6 per cent., had become deaf through measles. Investigations based upon the returns of the deaf-mutes of Denmark have proved that 5.3 per cent. of the deaf-mutes with acquired deafness had contracted their deafness from measles.⁵ On the other hand, Itard considered measles to be a frequent cause of complete deafness,⁶ a statement which is corroborated by F. L. Meissner.⁷ It is to be expected meanwhile that the importance of any zymotic disease as to the etiology of deaf-mutism varies considerably in different countries and at different times—a fact also proved by the synopsis made by A. Hartmann,⁸ according to which the relative number of deaf-mutes whose deafness was acquired by measles varied in the different deaf and dumb institutions from 0.0 per cent. (Institutions of Meersburg and Gerlachsheim) to 46.9 per cent. of the inmates

¹ *L. c.*, p. 92, Nos. 36 and 40.

² Mygge on "Marriages of Near Kin, Considered Especially in Regard to their Significance for the Etiology of Deaf-Mutism." Copenhagen, 1879, p. 266. (This title is translated from the Danish.)

³ Mygind: "Uebersicht über die pathologisch-anatomischen Veränderungen der Gehörorgane Taubstummer." *Arch. f. Ohrenheilk.*, Bd. xxx., pp. 76-118.

⁴ L. W. Salomonsen: "Remarques sur l'étiologie de la surdi-mutité et sur l'enseignement des sourds-muets, principalement en Danemarc." *Comptes-rendu du congrès périodique international des sciences médicales*, viii. session, Copenhague, tome iv., section d'otologie, p. 45.

⁵ Investigations by the author not published yet.

⁶ Itard: "Traité des maladies de l'oreille et de l'audition," tome ii., p. 380.

⁷ F. L. Meissner: "Taubstummheit und Taubstummenbildung," p. 158.

⁸ A. Hartmann: "Taubstummheit und Taubstummenbildung," p. 76.

with acquired deafness (Regierungsbezirk Cöln). Amongst later authors Hedinger¹ found 1.0 per cent., Wilhelmi² 4.4, H. Schmaltz³ 7.0, and Uchermann⁴ (in Norway), 2.5 per cent. of the individuals with acquired deafness deaf through measles.

The history of the present case, combined with the morbid changes found by the post-mortem examination, makes it beyond doubt that the pathological process of the hearing organs of the deceased deaf-mute have been of the following character and have taken the following course:

During the attack of measles a bilateral inflammation of the middle ear has set in—probably secondary to an acute catarrh of the naso-pharynx. The former existence of such an inflammation is proved by the inflammatory residua found by the post-mortem examination of the tympanum, viz., (1) on the external wall (the membrane) the left membrana tympani almost entirely wanting, while the right one was the seat of a large calcareous deposit of such a considerable extent and thickness that it can hardly have been caused by anything but a purulent inflammatory process, the existence of which on either side is also proved by the existence of a bilateral purulent discharge. (2) Further, on the posterior wall of the tympanum the aditus ad antrum mastoideum was found closed, and the mastoid process sclerosed—a proof that also this portion of the middle ear has been involved in the inflammation. (3) Further, the internal wall of the tympanum was the seat of the stalactitic productions mentioned above, which exhibited strong evidence of a severe inflammation of the osseous structure of the tympanum. The osseous plate replacing the membrana tympani secundaria of the foramen rotundum must have had the same origin. This latter pathological change is found in

¹ Hedinger: "Die Taubstummen und die Taubstummenanstalten nach seinen eigenen Untersuchungen in den Instituten des Königsreichs Würtemberg und des Grossherzogthums Baden," p. 123.

² Wilhelmi, Felix: "Taubstummenstatistik der Provinz Pommern und des Regierungsbezirkes Erfurt, herausgegeben von A. Hartmann." *Zeitschrift f. Ohrenheilk.*, Bd. ix., p. 195.

³ H. Schmaltz: "Die Taubstummen im Königreich Sachsen," p. 149.

⁴ Uchermann: "Deaf-Mutism, Especially in Norway." (Title translated.) *Norsk Magazin for Lægevidenskaben*, 1890, No. 12, p. 13.

three previous cases of acquired deaf-mutism (Bochdalek,¹ H. Schwartz,² and Politzer),³ and in several cases where the cause of the deafness was unknown. (4) Finally, the normal muscles of the tympanic cavity were missing on either side—a circumstance which, together with the facts mentioned above *sub 1-3*, tends to prove that the middle ear has been at some time the seat of an inflammation, which has been especially intense and destructive in the inferior part of the tympanic cavity, and mostly in the inner portion of this, while the upper part, the so-called attic, has been but little involved in the severe inflammatory process. These latter circumstances seem also to bear strong evidence that the inflammation has reached the middle ear through the Eustachian tube.

The further progress of the pathological process has then undoubtedly been as follows: The inflammation has been propagated from the middle ear into the labyrinth through the *fenestra rotunda*, and has here especially caused destruction in the cochlea, the normal cavity and contents of which have been almost totally substituted by a permanent inflammatory product—sclerotic osseous tissue. In the other parts of the labyrinth the destruction has confined itself to the membranous structures, which in other post-mortem examinations of deaf-mutes have also been found missing, though in all these cases the origin of the deafness has not been stated for certain.

In a previous paper I have had an opportunity of laying stress on the fact that post-fœtal inflammatory processes may be—even entirely—localized to the labyrinth, and leave behind osseous tissue of more or less sclerotic character,⁴ while most other authors have considered such morbid changes of the labyrinth, when found by post-mortem examination, to be due to congenital malformation, because the

¹ Bochdalek: "Einige pathologisch-anatomische Untersuchungen der Gehör- und Sprachwerkzeuge von Taubstummen, als Beitrag zur Pathologie des Gehörsinnes." *Med. Jahrb. d. k. k. österr. Staates*, Bd. xl., oder neueste Folge, Bd. xxxi., S. 129-136, 269-277.

² H. Schwartz: "Beiträge zur Pathologie und pathologischen Anatomie des Ohres." *Arch. f. Ohrenheilk.*, Bd. v., p. 292, etc.

³ Politzer: "Lehrbuch der Ohrenheilkunde," 1882, Bd. ii., p. 809.

⁴ Mygind, *I. c.*, p. 113.

labyrinth, or a portion of it, seems to be missing, the abnormality thus appearing to be due to arrest of development. The correctness of this opinion of mine has since been confirmed by a post-mortem examination of a deaf-mute with acquired deafness, made and described by P. C. Larsen and myself¹; in this case the entire labyrinth was substituted by osseous tissue, which without any doubt was the residuum of a post-fœtal inflammatory process.

The present case forms an interesting supplement to that of Moos concerning a boy aged three, in whom an affection of the labyrinth developed during measles.² In this case (published quite recently), which was examined very minutely when the morbid changes were still fresh, there was found a perforation of the *membrana fenestræ rotundæ*, the adjacent parts of which showed intense congestion, while the *stapedio-vestibular articulation* was normal. As far as the labyrinth was concerned, the inflammatory process was most highly developed in the *cochlea*, and especially in the *scala tympani*. Although the morbid changes were of quite recent date (at the utmost two weeks old), ossification of the inflammatory products had already begun in the *cochlea*. There can hardly be any doubt that the pathological changes originally present in my case have been almost identical to those described so thoroughly by Moos in his case—the only case of post-mortem examination of labyrinth-disease caused by measles existing in literature where a microscopical examination has been performed. As far as the nature of the morbid changes in such cases is concerned, Moos states that the inflammatory process was accompanied by invasion of bacteria, the lining membrane of the *tympanum* being inflamed, while in the membranous labyrinth was found coagulation of the lymph and aggregation of lymphoid cells, together with formation of *thrombi* in the vessels caused by fatty degeneration of their *endothelium*; there was furthermore necrotic degeneration of

¹ P. C. Larsen and Holger Mygind: "Ein Fall von erworbener Taubstummheit, mit Section." *Arch. f. Ohrenheilk.*, Bd. xxx., p. 188.

² S. Moos: "Untersuchungen über Pilzinvasion des Labyrinthes im Getolge von Masern." *Zeitschrift f. Ohrenheilk.*, Bd. xviii., pp. 97-154. These *ARCH.*, vol. xviii., p. 49.

tissue, and in some places—as mentioned above—ossification of the inflammatory products.

It will be remembered that in the present case no sign of atrophy of the auditory nerve was found, although it had been out of function on either side for a considerable period of time. This is another proof of a statement made by me before, viz., that the auditory nerve has not a strong tendency to become atrophic from inactivity, atrophy of this nerve being altogether found only in a minority of post-mortem examinations of deaf-mutes.¹

It must remain undecided whether the slight flattening, etc., of the convolutions of the posterior and inferior parts of the left frontal lobe of the brain is to be explained as a result of inactivity of the speaking centre. In the case of acquired deaf-mutism examined recently by P. C. Larsen and myself, the flattening of the third convolution of the left frontal lobe was very much more pronounced. It is, however, to be supposed that atrophy of this portion of the cortex of the brain is not so uncommon in deaf-mutes as the existing reports of post-mortem examinations might induce us to think.

¹ Mygind : "Die angeborene Taubheit," p. 58.

THREE CASES OF DUMBNESS (APHASIA) WITHOUT
DEAFNESS, PARALYSIS OR MENTAL DEBILITY
(TWO CONGENITAL AND ONE CAUSED BY FRIGHT
AT THE AGE OF TWO YEARS AND A QUARTER);
ALSO

A CASE OF DEAF-MUTISM THE RESULT OF FRIGHT;
A CASE OF CONGENITAL DEAF-MUTISM THAT DIS-
APPEARED; AND
A CASE OF DUMBNESS FROM PARALYSIS OF THE
TONGUE.

By V. UCHERMANN, of CHRISTIANIA, NORWAY.

Translated by Dr. J. M. MILLS, New York.

IN the course of my investigations of deaf-mutism, I came across two cases of congenital aphasia and a case of speechlessness caused by fright, which I considered worthy of publication on account of their rarity as well as the theoretical interest attached to such conditions. I will first refer to the different forms of the disease and add a few critical remarks. This will afford an opportunity to mention a case of deaf-mutism produced by fright, a case of congenital deaf-mutism that disappeared, and also a case of aphasia from paralysis of the tongue.

CASE 1. B. M. G., born in Birid, on December 21, 1872. The parents were in good health, of temperate habits, and not related. Among the relatives of the mother was a case of deaf-mutism, otherwise no instance of deafness or mental debility. The patient is the next to the youngest of seven children, the other children being in good health. There is nothing to be stated concerning the period of pregnancy, or the hygienic condi-

tions. The boy has good eyesight and hearing, understands everything that is said to him, and does everything that is ordered of him in a methodical manner, but up to the age of nine and a half years, when he entered the Deaf and Dumb Institute at Hamar, he could only say "yes" and "no," and only began to say that when he was six and a half years old. When he was quite young he had whooping-cough. Concerning his stay at the institute, the superintendent, Mr. Hofgaard, writes: "In the class in articulation, he was, in the beginning, a troublesome pupil, especially was it difficult to pronounce the 's.' In the year 1886 he was sent home in order to attend the normal school. His speech was always difficult and at the same time of a spasmodic character. He always spoke as little as possible, and if he wished to say anything he required time in which to collect his thoughts and compose himself. At the same time he had trouble with his under jaw and tongue."

When I saw him, in the year 1885, his faculty of speech, in repeating what was spoken by others, was very good. Intentional voluntary conversation, however, was difficult; stuttering or spasmodic movements of the lower jaw were not apparent. He had an intelligent expression and, as the superintendent states, learned easily. The examination of the ear gave the following result: Both *Mtt* looked dull in their anterior and posterior portions, a trace of the reflex was present. He heard (with face turned away) whispered words and sentences at a distance of 7-8 metres. Watch in 24-36." He stated that he had always heard well: "He heard and understood everything that his parents, sisters, and brothers said to him, but he could not speak." Pharynx and larynx were normal.

This is the case which I described briefly in 1885, in my report to the "kirke department" (*s. Tidsskr. for prakt. med.*, 1886).

CASE 2. E. K. A., Dybirk, born in Oerlandet, on November 9, 1869. The parents are not related and are quite healthy. No instance of deaf-mutism, deafness, mental debility, or epilepsy in the family. He is the youngest of eight children, the next youngest is four and a half years older. The other children are well. He entered the public Deaf and Dumb Institute at Drontheim on October 17, 1888. At that time he could only say "yes" and "no," and notwithstanding his good hearing and understand-

ing, could never say any more. The examination of the patient in February of the same year showed the following condition : Right *Mt* perhaps somewhat indrawn ; the left *Mt* was dull, whitish, with a white spot anteriorly, a trace of the reflex. Both drums are movable (Delstanche). Heard a whisper, with both ears, in at least 24.' Has normal hearing for all instruments, tuning-forks (from 64-4096 vibrations, Appun), Galton's whistle, Politzer's acoumeter, table bell, watch, etc. Nose, pharynx, and larynx are normal ; vocal cord, normal in appearance and possessing normal movement. The tip of the tongue deviates a little to the left when thrust forward. He cannot stretch it out to either side (of the corner of the mouth) nor bend it down between the under lip and the incisor teeth of the lower jaw. When he opens and closes the mouth many times in succession (moves the lower jaw up and down), there is often, at the same time, a side movement of the jaw before he attains his object. When ordered to close his teeth firmly together, the mouth is drawn somewhat upwards and towards the left.

The teeth are irregular (rachitic). He cannot whistle, but places his mouth in the proper position. He appears intelligent, understands everything that is said to him, and can repeat all the letters of the alphabet ("r" and "s" with difficulty) and syllables, also many words. He is easily embarrassed and lacks self-confidence ; often there is a spasmotic movement of the lower jaw toward the sides when he attempts to pronounce words which he cannot bring forth.

CASE 3. M. O., Myren, born on January 1, 1854, in Fredoe (near Kristiansund), the next eldest of six children. The parents and the rest of the family are healthy in every respect ; not related. According to the mother's statement she was an unusually lively and well-developed child, spoke distinctly, and was perfectly well. Her greatest pleasure were some sheep with which she always amused herself. For some reason or other this annoyed the young shepherd, who determined to frighten her. He carried out his intention by placing his jacket over his head and waving his arms. When the parents came to the child they found her screaming persistently, and this screaming continued for fourteen days. She also, in consequence, suffered with epilepsy, which lasted four years. This girl, who had previously spoken easily and fluently, now, when she attempted to speak, began to stutter and could not utter the words, "and, therefore, she gave up the

attempt to speak." At the age of thirteen she came to the public deaf-mute institute at Drontheim, where she remained five years and learned to read and write. In the records of the institute the hearing is not mentioned, but, according to information received, it was noticed that she heard. At that time they were instructed principally according to the writing method (writing and hand alphabet). When she returned home she was still unable to speak, so her mother began to learn the hand alphabet in order to be able to converse readily with her. As, however, she was always with her sisters and brothers she began gradually to pronounce a few words, and in the course of a year her vocabulary had increased so that she could, to a certain extent, make herself intelligible to her mother and acquaintances. When with strangers she was embarrassed and preferred to conceal herself.

When I examined her in March of the same year her condition was as follows: She heard the tuning-fork with both ears, tuning forks of 64-4096 vibrations Appun, and Galton's whistle, Politzer's acoumeter at least 12', a whisper in 14', watch in 6-8''. The right *Mt* was somewhat dull in the lower and posterior portion, otherwise normal. Both drums somewhat movable (Delstanche), left rigid. Rinné +. I heard F (fork) of 256 vibr. (App.) 40 seconds longer on the mastoid process and 10 seconds longer by air-conduction than she. The tongue is movable in all directions, but it trembles very much when in motion, and can only with difficulty be held quiet in the same position. Nose normal. The patient has lateral granular pharyngitis; soft palate has normal movement. The larynx is normal in appearance, but she cannot say "a" when the tongue is held outstretched. Pronounces all the letters, but d, t, and r with difficulty. For a, e, and o she says ha, hä, and ho, but i and ü distinctly. She cannot combine words into sentences, though she can put two words together, as, for example, "fint veir." Whereas she reads readily and fluently what she has copied in school from a "kristendoms-slaers" (catechism), though occasionally she loses her breath and "sputters out" some syllables. She cannot regulate her breathing. She has an intelligent appearance and possesses ordinary faculties.

Instances of congenital aphasia are very rare, at least very few are recorded.

Broadbent (*Medico-Chirurgical Transactions*, 1872) cites a case of partial dumbness in a boy eleven years old. He was the fifth of nine children of whom five were living at that time. The two youngest were stillbirths, and one child died with convulsions. The father died of phthisis. The patient was a delicate child, but never suffered with convulsions or any dangerous illness. When six years old he was run over and the left side of his head and the left arm and leg were injured. But he had not spoken before this occurrence. He could only say "no," "e" for yes, "dunno" for don't know, instead of father "fave," instead of mother "move," and an indistinct "keeger-kruger" in reply to all questions. Exceptionally he would utter other words, as, for example, "all right," "thank you." He could write his name, but could not write "yes," or "no," or other simple words. He could copy a card printed in written letters, but did not understand the meaning of a word, as, for example, "pen," only that of some figures.

From Broadbent's account we cannot ascertain if the boy received regular instruction; most likely he did not. It is only stated that his mother exerted herself diligently to teach him to speak. Broadbent assumes that the difficulty in speaking was not alone in articulation, nor was he an idiot. He understood what was said to him and could do errands correctly. He watched to see if he received the correct change if told beforehand how much it would be. As previously stated, he copied print in written letters, but, as it seems, could not connect the written sign with the sound of the word, with the exception of a few figures. Broadbent infers that the defect was due to a "lack of power to formulate his will into words," a central aphasia. Hartmann considers it likely that this is only an instance of mental debility ("Die Staubstummheit," S. 26), therefore an aphasia that is analogous to that found in idiots. "They do not speak, because they have nothing to say" (Griesinger). But it is apparent that Broadbent was aware of this, so that his conception of the case seems more probable.

In the year 1873 Waldenburg reported, in the *Berliner klinische Wochenschrift*, No. 1, S. 8, a case of congenital aphasia, which is cited by Hartmann (l. c., S. 26) as the only

positive authentic case of complete congenital aphasia. The mother, in the third month of pregnancy, became paralyzed on the right side, and was aphasic. Since his birth the right half of the boy's body was more poorly developed than the left, and notwithstanding his good intelligence and hearing he did not learn to speak. It appears from Waldenburg's account that, in the first place, the aphasia was not complete; the child pronounced a few words "with evident difficulty," as "okka," for uncle. There was paresis of the right side of the posterior portion of the palate, and also afterwards, as it seems, paresis of the tongue (which could not be stretched out beyond the lips, no deviation of the tip of the tongue) and possibly also the lips. No mention is made of the mobility of the tongue toward the sides. According to the statement of the father there were also indications that deglutition was difficult.

There are, therefore, besides the symptoms of an affection of the left cerebral hemisphere (paresis of the right half of the body), also symptoms of an affection of the medulla oblongata, most likely of a secondary character (secondary sclerosis), as the child had formerly spoken a few words with the greatest ease before it was seen by Waldenburg, but still possibly it may have been congenital, and in that case an essential cause of the dumbness. The appearance of the child is said to have been very intelligent and the hearing was normal. He was six years old.

It is by no means my intention to deny that there is, at the same time, in this case an affection of the centre of speech, but the case is, as stated, not clear. It would be of great interest to ascertain something of the later development and future of the patient. The boy was from Schlesien, and his name was Richard Reh. The other two cases quoted by Kussmaul, that of Clarus, concerning a boy of three years, and that of Benedikt, a boy four years old, I consider, as Hartmann does, entirely unproved.

Imperfect or defective speech in children of that age is quite common, and is most frequently due to tardy development, caused either by feeble faculties or impaired hearing, or because the parents did not devote sufficient attention to

them; while, on the contrary, the two cases cited by me must be considered as congenital ataxic (motor) aphasia.

The first patient in particular had a very animated, energetic appearance and also a good disposition, according to the testimony of all those who had intercourse with him (the pastor, teacher). This was also evident later when he went to school. Upon inquiry I obtained the following information from the superintendent, Mr. Hofgaard, of the Deaf and Dumb Institute at Hamar :

"When he came here he could neither read nor write, nevertheless he did that which we requested of him, just as well as other children of his age, who heard well. He wrote with more ease than any of the others in the class, and, in fact, as well from dictation—in that he had normal hearing—as when writing independently, for being able to hear he possessed more power of speech than his deaf school-mates. His reading, as well as speaking, was all the time somewhat difficult.

In contrast with Broadbent's case the cause here cannot lie in the same location, but more peripherical, either in the line of communication between the central station (the intelligence), and the motor centre of speech right in this or between this and the corpus striatum. I believe, notwithstanding the appearance of the drum, that I cannot retain the theory formerly advanced by me, according to which defective hearing, in the first years of childhood (when, as is well known, speaking is most easily learned), was supposed to produce a certain inertness in the nerve-tract, particularly between the centre of hearing and the central station (entrance line), secondarily between this and the periphery (line of exit).¹ This theory is untenable, partly because the boy, so far back as he can remember, always heard well, and partly because he quickly comprehended what was said to him. The inertness was first apparent in the centrifugal current. It is difficult to say what changes have taken place in the tissues. That they cannot be very extensive or of a progressive character

¹ All symptoms of paresis, as may be recalled, and is often the case, were wanting here.

is shown by the partial recovery of the boy by means of the instruction ; so that now only a certain slowness in intentional speech remains. That it is not of a purely physical, molecular nature, which opinion might possibly be held of hysterical aphasia, is evident from the fact that this inertness is still present. It appears to me that the next most plausible deduction is that there was an extravasation of blood into the nerve-tract, either internal or external (peripheric) to the motor centre of speech or right into it, resulting in a cicatrix which could only be eliminated and made harmless by the movement of the surrounding neighboring cells.

The dysarthric phenomena, in this patient, were only of a secondary and subordinate importance, not at all prominent, and as is often the case in aphasic conditions.

The second case is more complicated, inasmuch as in this instance there exists a limited movement of the tongue, which cannot be carried to either corner of the mouth, or bent between the lower lip and the incisor teeth of the lower jaw. The question is whether we are justified in considering this an affection of the medulla oblongata or pons, or whether the cause must be sought farther upward. In my opinion the latter is more probable.

The third case is notable from the fact that the acuteness of hearing is less than in the other cases (though she hears a whisper in 12-14'), which together with the causes advanced (fright, epileptiform convulsions) indicates a larger extension of the original central affection, probably including the centre of hearing itself and a greater or smaller part of the cortical substance. It could not be ascertained how much weaker the hearing formerly was than now. That fright can be the cause even of complete deaf-mutism is shown by a carefully observed case (the fourth) that will be more minutely described later on. The child, in every respect vigorous and healthy when three years old, was left in sport alone upon the roof of a playhouse. It became very much frightened and cried unceasingly ; upon this followed an illness of two months. This illness manifested itself principally in a high degree of irritability without fever or convulsions, and with complete deafness for speech

and consequent deaf-mutism. The child is now a grown up intelligent young man with complete deafness of the right ear. He has hearing for sound in the left ear, but no hearing for voice or speech. He hears the sound but does not comprehend what it is.

In contrast to this a case (5) has been reported to me of congenital deaf-mutism that disappeared, which possibly could be pronounced of a central nature. The case is as follows:

Johan Johansen Tórndseie, born November 26, 1881, in Vaug. Illegitimate child. There is no instance of deaf-mutism among the relations, nor of deafness, disorder of the mind, idiocy, feeble-mindedness, or retinitis pigmentosa. At the age of three, the child being then in miserable and emaciated condition, was brought to its present foster-parents. It was troubled very much with worms. On one single occasion it was delivered of sixty-seven lumbricoids. It improved gradually in bodily strength, but signs of hearing were observed only in the last two years (1888-89) particularly in the last year. Has ordinary faculties. 1889: hears now loud speaking in 6-7 metres, repeats with faultless voice several words (nei, ja, ske, moster, etc.).

I had no opportunity to examine her ears; however, there is no report of a discharge. The relatively considerable acuteness of hearing, which was developed in the course of two years, seems to argue against a peripheric cause of the deafness, which in the course of a few years disappeared of itself; while on the contrary helminthiasis is a well-known cause of aphasia in children (S. Kussmaul: *Die Störung der Sprache*; Arndt-Eulenburg's *Encyklopädie*, 2 Ausg.), and this was present, in this case in a most aggravated form. The explanation in this case is that the influence was of a reflex nature, introducing a "paralysis" (probably a vaso-motor and atrophic lesion) of a certain section of the surface of the brain. That this action extended, at the same time, to the labyrinth must be conceded in those cases where all hearing for sound ceases temporarily or is absent, as the history of the disease in this case indicates. As long as we do not possess a more exact examination of the ear nothing more definite can be said.

It appears, therefore, that many things point to the correctness of the above-mentioned explanation of the third case. It is difficult to give an opinion as to the nature of this central affection. It might be considered a purely molecular change, or rather, on account of the persisting functional debility, a disturbance in the circulation, and consequent disturbance of nutrition in the region mentioned. Arndt (*l. c.*) calls this condition simply a paralysis, without thereby being any more explicit. Pathological-anatomical examinations alone can bring us nearer to the truth.

In conclusion I would mention a fourth (6) case of infantile dumbness of which I only recently obtained information. Also this patient had good hearing and perceptive power; did not, however, belong to the aphasic group, in that in this instance the cause is a tongue and pharynx paralysis, most likely of bulbar or mesencephalic origin. This patient also received instruction in a deaf and dumb institute, naturally without success. The case is as follows:

A. M. Andreasdatter, born in 1857, in Grimstad. The father was a porter on the quay; was not addicted to drink. The parents enjoyed good health; were not related. No instance of mental debility among the relatives. Mother died on child-bed. Good hygienic surroundings. Patient is the third of several children; the others were healthy. In former years she suffered with a severe form of epilepsy, but is now well. Passed through the Deaf and Dumb Institute at Christiansand. Is unmarried. The superintendent added to the history: "Feeble, body deformed. Is not a deaf-mute. Squints very much and is very lame." In addition I received from Dr. Ellefsen in Grimstad the following information: She has paresis of the tongue. It cannot be stretched forward nor can it be moved toward the side. She can say "ja" and "nei," "farmer," and a few other words, but everything indistinctly. The larynx shows nothing abnormal. She has some difficulty in swallowing solid food, but not in chewing. Smell and hearing are very acute. Understands everything that is said to her, but can neither read nor write. Co-ordinate movements with the arms and hands are almost impossible. Can walk, however, tolerably well, even a long distance. Looks very small and thin; the expression of the face is old-fashioned. The

form of the cranium indicates microcephalus. Lacunar somewhat sunken in the uppermost parts. The father asserts that nothing abnormal was to be seen at her birth, but that three weeks after birth the child began to be sickly, and that the above-mentioned symptoms developed gradually later on. She did not learn to walk until she was over three years old. She is myopic and has convergent strabismus ; there is a paresis of both upper extremities. Upon inquiry I obtained later the following additional information : The squint mentioned is undoubtedly of a paralytic nature, that is, a paralysis of both *muscul. extern.* (*N. abducentes*). Atrophy of the muscles of the tongue cannot be discerned. The muscles of the upper as well as the lower extremities are somewhat poorly developed. The muscles of the hand, especially the thenar, are atrophic, as also the right lower extremity, which is 4 cm shorter than the left. The sensitiveness is not appreciably decreased in any part. There is no contraction or rigidity in the muscles of the extremities.

It appears that this is a case of an atrophic, perhaps a sclerotic, process that has run its course and that is located in the medulla oblongata and possibly also in the pons (and the cerebellum?). There are also symptoms of an affection of the cortex of both cerebral hemispheres, particularly on the left side (polio-encephalitis, Strümpel). The case is, as such, interesting and also merits attention for the reason that it was sent by mistake to an institute where it did not belong. The physicians who have explanations to offer concerning abnormal children should bear in mind that this case, though rare, may yet occur.

A CASE OF PARTIAL DEVELOPMENT OF BOTH AUDITORY ORGANS.

By TH. HEIMAN, of WARSAW.

Translated by CASEY A. WOOD, M.D., of Chicago.

(*With Three Wood-cuts.*)

MALFORMATIONS of the auditory apparatus are not, in my experience, of every-day occurrence. They may affect the external, the middle, or the internal ear, and in all cases present themselves either as a partial or as an adventitious development of a whole section or of single parts of the organ.

Schwartz and Montain describe a case of complete absence of auditory nerve and labyrinth. Michel mentions one instance of unilateral and Moos and Steinbrügge another of bilateral defect of the labyrinth. Hyrtl and Voltolini observed a cochlea in the early stage of its development—in its vesicular form. The former also noticed a case of absence of the aquæductus vestibuli. Buhl and Hubrich believe that absence of the cochlea is very frequently associated with incomplete development of the semicircular canals. Toynbee, Claudio, and others describe defects in various parts of the labyrinth. As examples of adventitious development may be mentioned two ampullæ for one horizontal semicircular canal (Gerlach), a double aquæductus vestibuli (Hyrtl), etc.

The tympanic cavity may be entirely wanting or be replaced by bone.

Partial defects are: defective development of the emi-

nentia pyramidalis, absence of the promontory, of the canal for the tensor tympani, of the round and oval windows, of one or more ossicles, etc. In the same way absence of the Eustachian tube (Gruber), of its cartilaginous portion (Moos and Steinbrügge), and of one of the ostia (Wreden), has been recorded. Cassebohm and Barbou found a double tympanic cavity in a bicephalous monster.

Various malformations affect the external ear. These are commonly accompanied by abnormalities of the middle ear and almost always by arrested development of the auricle. In such cases a normal auricle is rare. The usual locality of the external meatus has been indicated in more than one instance by merely a bony depression directed towards the tympanic cavity. The following are the partial defects: absence of the cartilaginous portion of the auditory canal and of the annulus tympanicus; arrested ossification after birth, so that later on in life both the annulus tympanicus and the membranous canal retain their primitive condition. A double external meatus has been recorded (Bernhard). Worthy of notice is the so-called fistula auris congenita, which, as we know, takes the form of a canal running parallel to the external meatus, 1 cm above the tragus and 1 or 2 mm in front of the helix. According to Urbantschitsch this fistula has no connection with the development of the ear.

Entire absence of the auricles is rare; it more frequently happens that component parts of them fail to develop. Double auricles, adventitious growths of various portions, as well as cartilaginous and bony protuberances, are also not uncommon.

Apart from these, which are perhaps the chief malformations one meets with, there are congenital defects, of various degrees, that affect the form, size, attachment, and arrangement of the different parts of the auditory organ.

The malformation which I am about to describe occurred in a child which I examined two days after birth. It consists of a *complete absence of both external meatuses with an incomplete development of the auricles.* (See accompanying figs. 1, 2 and 3.) A considerable portion of the palate is also wanting posteriorly; the articulation of the temporal bone with the zygoma is incomplete

and the middle ear is evidently undeveloped. The skin and cartilage of the external ear are well developed on both sides. The lobules and in part the helices are normal, the former being immediately, and without any indication of a depression, continuous at their inner margin with the skin of the face. The upper border of the left helix is adherent to the facial skin, as indicated by a superficial groove that terminates in front at the anterior-superior angle of the auricular attachment by a minute fossa. The antihelix and crura bifurcata are replaced by a cartilaginous, ring-like tuberosity whose convexity is directed inwards—in a direction opposite to the normal. There is a distinct depression (concha?) in this circular piece of cartilage. Beneath it is a marked hollow in the skin corresponding to the external opening of the meatus auditorius externus.

The site of the external opening on the right side is occupied by a small furrow. In front and above it are two cartilaginous tubercles covered with normal skin (antihelix?); their direction is from within outwards and somewhat upwards until their termination in the helix. Where under normal conditions one of the crura bifurcata is found, along with the fossa triangularis and navicularis, there is a round depression in the skin which in its lower segment shows a semilunar groove and in its upper a small fossa. Other parts of the auricle could not be traced in the external skin. The cartilage of the tragus could be plainly felt. On the posterior surface of both auricles there are several transverse superficial furrows; on the lobules, round depressions.

The middle section of the soft palate, as well as the centre of the hard palate behind, is wanting, a defect measuring transversely about $1\frac{1}{2}$ cm and antero-posteriorly $2\frac{1}{2}$ cm. The nasal structure is normal. The incomplete articulation of the zygomatic process of the temporal bone with the processus temporalis of the zygoma is marked by a depression of the skin—best seen on the right side.

The cause of this malformation, as in all similar cases, is unknown. The infant's mother, a poor woman, made her living by carrying heavy baskets, which rested and more or less pressed upon her abdomen; possibly this may have had some effect upon the development of the child; and yet her other children, nine in all, were brought into the world under the same influences, and each was well formed.



FIG. 1.

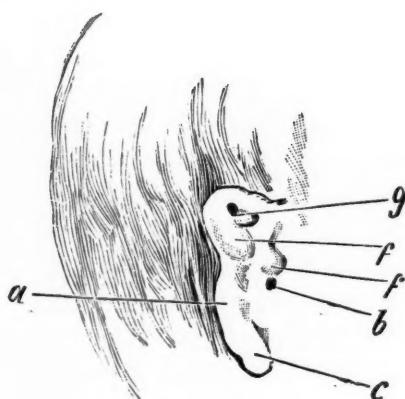
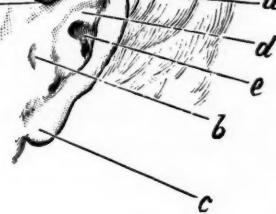


FIG. 2.

a = *Helix*.
b = *Introitus m. aud. ext.*
c = *Lobulus*.
d = *Cartilago circularis*.
e = *Fossa intercartilaginea*.

ff = *Tubercula cartilaginea*.
g = *Fossa supra tubercula*.
h = *Fossicula in angulo superioris helicis*.
k k = *Sutura squamoso-xygomatica*.

FIG. 3.



Before discussing the question as to what period (month) of intra-uterine life these malformations showed themselves, we must refer to certain details connected with the development of the external and middle ear.¹ These, as is well known are developed from the primary branchial cleft. After the coalescence of the anterior or ventral part of this fissure, its dorsal portion is converted into a tubule, of which, at an early stage, it is possible to distinguish a very short external segment covered with the ectoderm, and an internal and longer section clothed with the entoderm. Between these, later on, is developed, from the primary branchial arches, a secondary formation which is mainly derived from the mesoderm. Externally it is covered by the ectoderm, and internally with the entoderm. On its inner aspect it consists of soft gelatinous connective tissue, which contains the ossicles that are formed from the primitive branchial arch. The posterior part of Meckel's process serves for the development of the hammer and the incus, while from the posterior aspect of the branchial arch is derived the stapes and its muscle.² The areolar tissue surrounding the ossicles disappears from the inner portion (covered with endoblastic cells), which corresponds to the primitive internal embryonic groove, and leaves an air-space in which are the small bones. In this way the tympanic cavity is formed. The small bones do not lie free within the tympanum, but are covered by the mucosa, which originates from the mesoderm. The embryonic connective tissue usually disappears from twelve to twenty-four hours after birth, but it may do so before it—that is, before respiratory movements commence (Zaufal, Urbantschitsch). Incomplete absorption of this foetal tissue may be detrimental to the hearing of the child. The primitive cavity of the tympanum communicates with the pharynx by means of an opening whose prolongation later on becomes the Eustachian tube. The external portion of the secondary

¹ I shall not refer to the formation of the internal ear, as that is developed independently of the other portions of the auditory organ; moreover, in the case under discussion we have no direct evidence that the labyrinth was or was not developed.

² According to Kölliker and Balfour, the stapes is developed from the cartilaginous wall of the labyrinth.

areolar tissue formation above mentioned is not so delicate as that which presents towards the tympanic cavity, and from it the membrana tympani originates. The outer ectodermal depression becomes the meatus auditorius externus.

The auricle at first arises from the posterior aspect of the external opening in the form of a small protuberance (Schenk); it is visible in the sixth week of foetal life, and in the eighth the helices are discernible.

The palate, which divides the naso-pharynx into an upper nasal and a lower pharyngeal space, is formed from horizontal bony plates (processus palatini) that have their origin in processes of the superior maxilla. The palatine margins approach one another in a direction from before backwards, until at the end of the third month of intra-uterine life the entire fissure is completely closed with the exception of a small opening anteriorly—the naso-palatine canal. Failure to accomplish this closure results in various degrees of the malformation known as “cleft palate.”

In our case the condition of the auricles, the absence of the external meatus, and the defect in the palate, lead us to conclude that development of the parts must have been interfered with between the end of the second and the beginning of the third month of foetal life, and this formative failure affected all the parts between the naso-pharynx and the auricle, and included the middle ear.

Whether the labyrinth was also included in these malformations it is impossible to say. Children of so tender an age do not respond to sounds of any kind (v. Troeltsch); how much greater must the difficulty of hearing be when changes like those above described are present! If later on in life one could demonstrate, by a tuning-fork examination of bone-conduction, that sounds were perceived, there would be definite grounds for asserting that little or no malformation of the internal ear had occurred.

It would be waste of time to consider the possible treatment of such a case as this, and I do not care to indulge, as has been done, in a purely theoretical discussion of the question. It only remains to add that the child lived three weeks, and finally died of starvation, having been unable to take the breast or any other form of nourishment.

FOREIGN BODY IN AUDITORY CANAL FOR TWENTY YEARS.

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PITTSBURG, PA.

On June 25, 1891, Mrs. W—— aged thirty years, consulted me on account of noises in her right ear with some loss of hearing. Upon examination the auditory canal was found to be filled with impacted cerumen. The cerumen was removed by means of warm water and a syringe. With the cerumen I noticed two hemispherical bodies of dark-brown color and solid consistence, which upon examination proved to be a pea split into halves. Upon questioning the patient I elicited the following history :

When ten years of age, P., in play, put a pea into her right auditory canal ; she was taken to a physician by her father, but whether he claimed to have removed it or not she does not remember. After this she experienced no difficulty whatever until eight years ago, when she accidentally thrust a knitting-needle into her right auditory canal in the attempt to stick the needle into her hair. This accident caused considerable pain and some little bleeding. She again consulted a physician, who, without an examination, claimed that she had perforated the membrana tympani ; he advised her to simply wash out the ear and apply moist heat. Immediately following the accident, P. claims she could hear nothing ; her hearing became better in a few days, and in two weeks, she states, it "was all right again." Since then she has had no trouble with her ear until about ten days ago, when she noticed noises and some loss of hearing.

There is no doubt in my mind but that the pea remained in the auditory canal since its first entrance twenty years

ago, or when P. was ten years of age. She had never consulted an aurist until she came to me.

Before the removal of the cerumen and pea P. could hear the tick of my watch at two inches, immediately after the removal at six inches, and on the following day at fifteen inches. After the removal of the cerumen and pea the canal presented a perfectly normal appearance, the membrana tympani was slightly injected, but no more than one would expect after syringing an ear. There were a few granulations, which bled slightly on the super-posterior quadrant of the membrana tympani, the seat, no doubt, of the injury inflicted by the knitting-needle.

A NEW UNIVERSAL DOUBLE-ACTING SNARE.

By CHARLES A. BUCKLIN, A.M., M.D.

(With a Wood-cut.)

THE good principles of all similar instruments have been combined in this snare and their inherent defects have been obviated.

The wire is attached to a solid stylet, the objections to which are overcome by the powerful ratchet motion which draws it. A screw motion is also attached to the same stylet, thus enabling the operator to use a very slow-cutting snare, where hemorrhage is feared, while the ratchet motion provides a rapid cutting one where there is no reason to expect hemorrhage. The handle and ratchet motion may be detached at pleasure, leaving an instrument suitable for the slow strangulation of a very vascular growth.

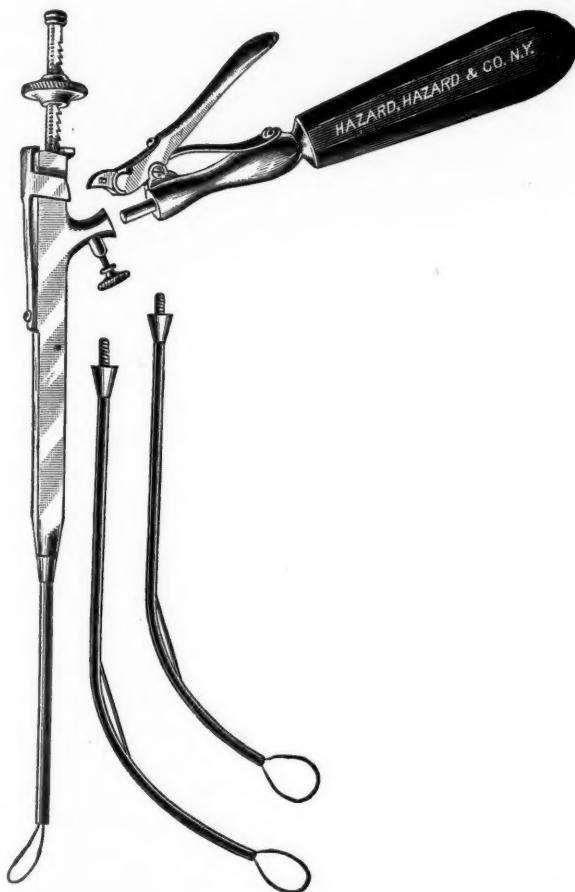
The instrument has a straight tip for the nose, and curved tips for reaching the larynx and naso-pharynx through the pharynx.

In curved canulas all attempts to use flexible stylets under severe traction are dangerous, as they must break sooner or later in making the transit of the curve.

With this wire écraseur every benign neoplasm or hypertrophy found in the nose, naso-pharynx, or pharynx can be removed at a single sitting in a manner which commands the approval of the most conservative operator. This instrument also fully meets all the requirements possessed by Stoerk's laryngeal guillotine or wire écraseur, and furnishes one not provided with laryngeal forceps with a simple and

effective means of extracting many foreign bodies which lodge in and about the larynx.

If the instrument is firmly secured at the detaching joint, the wire properly fastened, and the clearances of the ratchet under strain are one thirty-second of an inch, it will never fail to cut any growth the loop embraces.



The straight canula is armed with wire by passing it through the eyes of the slightly projecting stylet from opposite sides; the required loop having been formed, the stylet is drawn by the ratchet motion and the projecting ends of the wire are cut.

The curved tips are armed with wire by bending one six-

teenth of an inch of the end of the wire at an angle of forty-five degrees. It is then passed through the first eye of the stylet into the opening at the curve of the canula with the convexity of the wire impinging on the concavity of the canula, having returned through the curved canula with its convexity impinging on the concave surface of the canula. When the wire appears at the opening it is twisted until the bent point is opposite the second eye in the stylet, which it will enter easily, and the loop is complete.

By the pressure of the thumb on the top of the instrument the wire loop after having been drawn can be returned instantly to position for further operation through any of the tips.

For further particulars and the history of steel-wire snares see *New York Medical Record*, July 4, 1891, p. 269.

DIFFERENTIAL DIAGNOSTIC POINTS BETWEEN HUMAN OLFACTORY EPITHELIUM AND RESPIRATORY CILIATED EPITHELIUM.

BY HERMANN SUCHANEK, ZURICH.

Translated and abridged by Dr. J. A. SPALDING, Portland, Me.

I HAVE already described in the *Archives of Microscopy*, vol. xxxvi., p. 375, *et seq.*, the normal structure of the olfactory mucous membrane, and I will here repeat so much of that description as may seem necessary to publish to those interested in the results of my long investigations into this topic.

"The normal human olfactory epithelium, which in the new-born alone extends continuously over the uppermost portion of the nasal cavities, and in older children and adults is only to be discovered irregularly scattered throughout that region, consists: (1) of a lining membrane of finest ciliated epithelium of easily differentiated, easily destroyed cilia (olfactory cilia), and therefore only to be seen in fresh specimens; (2) a protoplasmic border of unpigmented and pigmented cells containing the extreme terminations of the supporting and olfactory cells (bell cells); (3) a full development of supporting cells, and particularly of the zone of olfactory cells, together with a row of basal cells which without a dividing cuticle rest directly upon the tunica propria; and (4) a moderate amount of pigment which surrounds Bowman's glands and the olfactory fibres in heaps and stripes."

(The rest of the paper, some five pages long, contains infinite microscopic detail which for want of space we are regretfully obliged to omit.—H. K.)

REPORT ON THE PROGRESS OF OTOTOLOGY DURING THE SECOND HALF OF THE YEAR 1890.

By A. BARTH AND A. HARTMANN.

Translated by DR. MAX TOEPLITZ, New York.

a.—NORMAL AND PATHOLOGICAL ANATOMY, HISTOLOGY, AND PHYSIOLOGY OF THE EAR AND NASO-PHYRANX.

By A. BARTH.

I.—ANATOMY.

a.—HEARING ORGAN.

1. Prof. WAGENHÄUSER. Pathological anatomy of the hearing organ. Reprint from the "Text-book of Special Pathological Anatomy," by Ziegler, 6th edition, 1890.
2. MÜLLER, E. Contributions to the anatomy of the tympanic cavity. *Med. Correspondenzbl. des Würtemb. ärztl. Landesvereines*, 1890, vol. lx., p. 233.
2. SCHEIBE, A. Bacteriological investigations of otitis media in influenza. (From the Pathologico-Anatomical Institute at Munich.) *Centralbl. f. Bacteriologie u. Parasitenkunde*, vol. viii., p. 225, 1890.
4. MAGGIORA, A., and GRADENIGO, G. Bacteriological observations upon the contents of the Eustachian tube in chronic catarrhal inflammations of the middle ear. *Ibid.*, vol. viii., p. 582, 1890.
5. GLÄSER, E. Investigations on cholesteatomata and their teachings regarding the origin of these growths. (From the Pathological Institute at Breslau.) *Virchow's Archiv*, vol. cxxii., p. 389, 1890.

6. HABERMANN, I. Clinical communications. Hemorrhages in inner ear. (From Prof. Chiari's Pathologico-Anatomical Institute in the German University at Prague.) *Prager med. Wochenschr.*, 1890, No. 39.

7. SCHWABACH, Berlin. Disturbances of hearing in meningitis cerebro-spinalis and their anatomical basis. Reprint from the *Zeitschr. f. klin. Med.*, vol. xviii., Nos. 3 and 4.

1. The material is clearly and concisely arranged upon an anatomical base.

2. SCHEIBE examined bacteriologically the secretions of eight cases of suppuration of the middle ear due to influenza, viz.: In three cases immediately after paracentesis, in three others one or two days after the operation, and in the remaining ones five and thirty-five days after the beginning of the discharge. The direct examination of the secretions taken from the middle ear showed in all eight cases, besides different cocci, bacilli which did not grow upon ordinary nutrient soil. Their length varied between 0.2 and 0.8 μ . Their form was also different. The number was the greater the fresher the case and the more acute the symptoms. The author hopes that a subsequent epidemic of influenza will throw further light upon the importance of these bacilli.

4. On account of clinical observations, which make it quite probable that chronic middle-ear catarrh develops by propagation of infectious microbes from the tube, MAGGIORA and GRADENIGO examined, in thirteen cases of progressive deafness, the secretions of the mucous membrane of the tube by introducing probes under certain precautions to the depth of about 8 mm into the tube, and from these they made pure cultures. There was found but a small number of putrefying microbes, which frequently occur in the air, but no specific microbe constantly and none in so great a number that the result of the examination might be considered positive. The authors, however, consider an infection during the period of hypertrophic and catarrhal naso-pharyngeal inflammation as probable. A treatment modifying the condition of the mucous membrane would not be proper before the beginning of atrophic changes.

5. After a careful review of the literature GLÄSER draws the following conclusions from a description of cholesteatomatous growth of the meninges: "In consequence of an unknown irritation the endothelial cells begin to proliferate upon the subarachnoidal trabeculæ; the proliferated cells mutually flatten by

pressure and finally form the well-known small scales," etc. The author, at any rate, does not consider it certain that all cases of cholesteatoma may be explained in this manner, and he expects further explanations, especially from the observations of clinicians. The paper, however, is quite valuable as to the present aspect of the question, and its careful perusal is urgently recommended.

6. HABERMANN, in a marked case of *pernicious anaemia*, examined the right ear and found in the cochlea and also in the vestibule and semicircular canals several hemorrhages. The vessels did not exhibit lateral excavations near the hemorrhages. There existed during life hardness of hearing, subjective noises, and vertigo. The two former phenomena are, according to the author, positively due to the hemorrhages. Habermann observed a case which presented, in ordinary anaemia, hardness of hearing, subjective noises, and vertigo, associated with retinal hemorrhages. He explains these appearances also as being due to hemorrhages in the inner ear. No autopsy was made. In a specimen taken from a woman who had succumbed to tuberculosis, anaemia, etc., Habermann found a large defect in the membrana tympani, and the remaining portion of the membrane extensively calcified. At one spot in this calcification numerous bone corpuscles could be recognized under the microscope. Haversian canals and lamellæ were not found.

7. SCHWABACH examined the petrous bones of a woman who had succumbed to meningitis cerebro-spinalis, associated with considerable disturbances of hearing. The concise result of the microscopical examination is as follows: Extreme filling of the vessels running along the acoustic nerve and in all parts of the labyrinth, purulent infiltration of the arachnoidal sheath of the acoustic in all its branches, numerous ecchymoses between the partially well-preserved fibres in its median portion, extensive destruction of the same in the peripheric portion, principally before its entrance into the modiolus; formation of granulation tissue in the province of the ramus superior and medius—viz., in the ganglionic swelling, and also in its further course toward the vestibular structures. Caries of the bone at isolated places, especially in the region of the maculæ fibrosæ, the carious portions being filled with granulation tissue. Numerous hemorrhages arising from the newly formed vessels of the granulation tissue in the intumescentia ganglioformis Scarpæ, and also in the ganglion spirale, and consequently atrophy of the ganglionic cells. Nu-

merous ecchymoses in the lamina spiralis, infiltration with round cells, and atrophy of the nerve fibres. Purulent infiltration of the connective-tissue lining of the perilymphatic space in the cochlea (scala tympani) and also in the vestibular structures, with more or less extensive destruction of the same ; formation of granulation tissue filling the vestibule entirely at some places. The changes were most marked in the right ear, which was affected in its function to a greater extent before death. In the middle ear there were still found the appearances of otitis media acuta, which had developed acutely three weeks before death and had hardly caused any objective symptoms ten days before death ; in the right one fibrinous purulent exudation in the fenestral niches ; in the oval window abundant granulation tissue with numerous thin-walled blood-vessels and a number of extravasations ; partial destruction of the ligam. annul. bas. stapedis and filling of this portion with granulation tissue or fibrino-purulent exudation respectively. The infective agent was the diplococcus pneumoniae (Fraenkel). According to course and anatomical condition the otitis media is considered to arise from direct immigration of the agens morbi into the tympanic cavity.

b.—NASO-PHARYNX.

1. LANDOW, M. A rare case of malformation of the nose, with some remarks upon the lateral nasal fissures. (From the surgical clinic at Göttingen.) *Deutsche Zeitschr. f. Chirurg.*, vol. xxx., p. 544.
2. FLATAU, TH. The connection of the nasal lymph channels with the sub-arachnoidal space. *Deutsche med. Wochenschr.*, 1890, No. 44.
3. SUCHANNEK (Zurich). Contributions to the finer normal anatomy of the human organs of smell. (With one plate.) *Arch. f. microsc. Anat.*, vol. xxxvi., p. 375, 1890.
4. BOUCHERON, M. Presentation of microscopical specimens (Présentation de pièces microscopiques). *Compt. rend. offic. de la Soc. franç., d'otol. et de laryng.* *Rev. de Laryng.*, etc., 1890, p. 577.
 1. In a boy, aged five, only the right half of the nose was completely developed. In place of the left half there existed a proboscis-like formation, covered with epidermis, 1.5 cm long and 0.75 cm in diameter. It was situated between the inner canthus and the nasal root, and was perforated by a canal. Near the

inner canthus there was a coloboma of the lower lid. Four years later there existed in place of the projection a fistula, discharging moderately. The formation is explained embryologically, according to His, by disturbances in the process of folding and by the advance and descent of the nasal fields. Such disturbances are principally caused by amniotic bands and meningoceles.

2. After pointing out the importance of the connection between the lymph channels of the interior of the skull and the nose, FLATAU gives the results of his examinations, made with injections in twenty-one rabbits and cats. A direct connection could be found only in the nerve canals. The mass injected into the spinal column always passed close up to the nasal epithelium. The efferent lymphatics, and also the glands of the naso-pharynx, were well injected at places from the subarachnoidal space.

3. The smelling epithelium in man does not cover in continuo in older children and in adults the parts heretofore described as the olfactory region, but only in irregular patches. The region of the olfactory epithelium is often marked at places by pigmentation of the mucous membrane. The smelling epithelium is covered with fine hairs, which are lower than the ciliated epithelium of the respiratory tract. SUCHANEK could not find a boundary of protoplasma (*membrana limitans olfactoria*). At places — together with the olfactory epithelium — non-pigmented cells, free nuclei, and so-called bell-shaped cells are found. The nuclei of the supporting cells are more oval; those of the olfactory cells are round. The nuclear zone of the olfactory cells appears in three to four layers. There exists a boundary group of basal cells, which are not separated by a cuticula from the tunica propria. The peripheral ends of the supporting cells are frequently pigmented. In the tunica propria there exist Bowman's glands and olfactory fibres, and, between these, masses of pigment. The author could not prove a connection between the olfactory fibres and the sensory epithelial cells.

4. BOUCHERON demonstrated microscopic sections of an embryo, from which he concludes that in a number of cases the duct of the hypophysis should be considered as the origin of the bursa pharyngea.

II.—PHYSIOLOGY AND PHYSICS.

a.—HEARING ORGAN.

1. EWALD, Prof. J. R. Dependence of galvanic vertigo on the inner ear. *Centralbl. f. d. med. Wissensch.*, 1890, No. 42.

2. PIPPING, H. Contribution to the timbre of sung vowels. Examination with Hensen's logograph, at the Physiological Institute at Kiel. (With two plates.) *Zeitschr. f. Biol.*, vol. xxvii. (N. F., vol. ix.), p. 1, 1890.
3. SCHAFER, K. L. The perception and localization of beats and differential tones. *Zeitschr. f. Psych. u. Physiol. d. Sinnesorgane*, 1, p. 81, 1890. (Rev. in the *Beibl. z. d. Ann. f. Phys. u. Chem.*, vol. xiv., p. 739.)
4. APPUN, A. Acoustic experiments on the perception of low tones. *Ber. d. Wetterauischen Ges.*, 1889, p. 37. (Rev., *ibid.*, p. 392.)
5. PARRAGH, C. Demonstration of the interference of isochronous sound-waves by means of the telephone. *Zeitschr. f. physik. Unterr.*, 2, p. 247, 1889. (Rev., *ibid.*, p. 481.)
6. MACK, E. Experiment upon the vibratory form of stroked cords. *Zeitschr. f. d. physik. Unterr.*, 2, p. 264, 1888. (Rev., *ibid.*, p. 481, 1890.)
7. RALEIGH, Lord. On bells. *Phil. Mag.* (5), 29, p. 1, 1890. (Rev., *ibid.*, p. 890.)
8. FISCHEN-BENZON, R. von. The sounding echo. *Zeitschr. f. physik. Unterr.*, 1, p. 116, 1888. (Rev., *ibid.*, p. 478, 1890.)
9. BREUER, J. (Vienna). The function of otoliths. *Arch. f. d. ges. Physiol.*, vol. xlviii., p. 195-306. (With three plates.)
1. EWALD found, in mammals and in man, that in galvanization of the inner ear the head became inclined toward the anode. After the removal of both inner ears, the head remained in its normal position. After extirpation of one inner ear and application of the anode to the same side, the inclination of the head toward the corresponding side takes place with but six volts. If the anode is placed, under the same conditions, upon the intact side, the head does not move. Hence follows that (a) the galvanic vertigo depends upon irritation of the inner ear; (b) the active pole is the cathode; (c) the turning of the head does not take place toward the irritated side.
2. For the arrangement of the apparatus and the experiments, and also for the tables, we refer to the original. The results of these investigations are as follows: It is not proven that inharmonious partial tones occur with vowels in singing. The vowel sounds are distinguished from the sounds of most of the musical instruments, essentially by the fact that the intensity of their partial tones—Helmholtz used at this place the word “over-

inner canthus there was a coloboma of the lower lid. Four years later there existed in place of the projection a fistula, discharging moderately. The formation is explained embryologically, according to His, by disturbances in the process of folding and by the advance and descent of the nasal fields. Such disturbances are principally caused by amniotic bands and meningoceles.

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tones"—depends not only upon their ordinal number, but principally upon their absolute pitch. Every vowel is distinguished by one or more intensifying regions of constant pitch; the intensity of the partial tone is the greater, the more exactly it meets the maximum point of such an intensifying region (this is in accordance with Helmholtz). With reference to the breadth of the intensifying regions, the author does not agree with Helmholtz. Sung vowel sounds contain only harmonious partial tones. The intensities of the single partial tones depend in no remarkable degree upon their respective ordinal numbers. The different vowels are distinguished among themselves by intensifying regions of different number, breadth, and position in the scale of tones. In different cases the wellnigh identical pronunciation of a vowel by different individuals speaking the same dialect could be determined.

3. The beat always appears to arise from the direction of the more intense of the two tones producing it. If they are approximately of equal intensity, it apparently develops in the region between the two sources of tone. The differential tone, however, is perceived on the side of the lower tuning-fork.

4. APPUN produced, by means of a metal lamella mounted with a metallic disc, tones free from overtones and found that in the descending tone series 10-9 vibrations, in ascending, however, only 11-12 vibrations are perceived as sound. With reference to tuning-forks he emphasizes the fact, that: 1. when the handle is placed in a wooden box provided with a rubber tube, instead of being firmly attached by clamps in the resonant case, it vibrates much longer. The resonator should be placed in front of the prongs. 2. The overtones may be eliminated by placing a firmly attached cloth ring, C^a 25 mm wide, over one of the prongs for one third of its length. The octave of the fundamental tone, which is said to form by longitudinal vibrations in the handle of the tuning-fork, cannot be eliminated.

5. By the insertion of a small inductor and a commutator between the poles of two telephones, the tone in the second telephone became more or less intense, according as the direction of the current is the same or opposite to that in the first telephone. In the telephones sound waves of the same or opposite phases are formed. Two combinational tones were simultaneously perceived.

6. A white cord is stretched above a black ground and just above it, at a right angle, a black one. If both be struck simultaneously, a parallelogram, appearing black upon gray, is formed in all the phases.

7. All bells are unsymmetrically formed, and, therefore, when struck, produce beats, which, according to the place struck and to the position of the ear relative to the bell, are perceived with varying distinctness. It is remarkable that bells do not sound much less musically than they really do.

8. When passing along a railing at every step a high, peculiarly whistling, rapidly disappearing sound is perceived, which is to be considered as the echo of the sound waves caused by the step and reflected from the rails. This sound is said to consist of but six to eight vibrations.

9. This full and elaborate paper is not adapted for a brief review. Every reader should form his own opinion of the importance of the subject from perusal of the original : 1. There are surely specific perceptions of the position of the head in reference to the vertical line and to progressive movement. It is proven for the former, that they originate in an organ situated in the skull. 2. It is highly probable from the topographical disposition of the otolithic apparatuses, that they, like the semicircular canals, are concerned in the perception of space. From their structure it is quite probable that the gravitation of the otoliths is the active irritation. 3. The phenomena of omission in frogs (and birds) with destroyed labyrinth and in deaf-mutes prove, that the labyrinth subserves the perception of position in space which is completely absent in the above-mentioned cases, if by immersion in water the perception of the gravitation of the body, which otherwise helps to determine its position, is for the greatest part eliminated. Every position of the head corresponds in man to a definite, characteristic combination of intensities of gravitation at the four maculae. If we suppose that the gravitation of the otolithic plates and their pressure on the cell hairs excite the nerve terminations and that this irritation produces in the centre the conception of the position of the head, we may consider the saccular apparatus of the labyrinth as an organ entirely suitable for the perception of position in space. We seem to be justified in and compelled to this supposition by the above-mentioned facts. Changes in the sensations of the otolithic membranes, which are not accompanied by perceptions of rotation, produce in the centre the conception of progressive movement. After having found the vestibule to be an organ of sense, which brings about the perception of turning by means of the semicircular canals, and that of progressive accelerations—and of the position of the head in space by the otolithic apparatus, I again take the privilege of pro-

posing for this group of perceptions the fitting name "*static sense*." A critical discussion of former papers of Delage, Aubert, Steiner, Baginsky, Preyer a. o. is appended. Baginsky's experiments especially suffer from the failure to prove, that dogs, whose cochlea had been destroyed in its function—and this but partially,—did not also lack the vestibule and the semicircular canals. "This identification of 'entirely deaf' dogs with those without a labyrinth is incorrect." Baginsky's conclusions cannot therefore be accepted.

b.—NASO-PHARYNX.

1. REDARD. Nasal obstructions, principally from adenoid vegetations, in their relations to deviations of the vertebral column and deformities of the chest (de l'obstruction nasale, principalement par les tumeurs adénoides dans leur rapports avec les déviations de la colonne vertébrale et les déformations thoraciques). *Gaz. méd. de Paris*, 1890, No. 12.

2. CERVELLO, V. Pulmonary emphysema from occlusion of the nasal passage (enfisema polmonare da occlusione delle vie nasali). *Riforma med.*, 1890, No. 116.

1. REDARD has frequently observed in children, simultaneously with occlusions of the nose, deformities of the vertebral column and of the chest, and he arrives at the following conclusions : 1. Nasal occlusion is a frequent cause of cyphosis and scoliosis. 2. Scolioses, dependent upon nasal affections, are mostly dorsal (?) with long curvature, frequent in women, and develop principally during the period of growth. 3. Adenoid vegetations play a more important part than the true tonsils. 4. Hypertrophy of the pharyngeal tonsil is the frequent cause of nasal occlusion. 5. Treatment of nasal obstruction rapidly improves many forms of cyphosis, scoliosis, and deformity of chest.

2. In dogs, whose nostrils were completely occluded by operation, pulmonary emphysema developed in a short time.

b.—PATHOLOGY AND THERAPEUTICS.

By A. HARTMANN.

a.—GENERAL LITERATURE.

1. LUDEWIG. Report on the work done at the Royal University Polyclinic at Halle from April 1, 1889 to March 31, 1890. *Arch. f. Ohrenheilk.*, vol. xxxi., p. 31.

2. HOFFMANN, EGON, Greifswald. Thirty-five cases of otitis media following influenza. *Deutsche med. Wochenschr.*, 1890.
3. SZENES, SIGISMUND, Budapest. Notes on the diseases of the ear during the late influenza epidemic. *Monatsschr. f. Ohrenheilk.*, etc., No. 11, 1890.
4. LUDEWIG. Influenza otitis. *Arch. f. Ohrenheilk.*, vol. xxx., p. 204.
5. SZENES, Budapest. The therapeutic value of some new remedies used for aural affections. *Therapeutische Monatsschr.*, No. 10, ff., 1890.
6. PATRZEK, Oppeln. Pyoktanin in otology. *Allgem. med. Central Zeitung.*, No. 63, 1890.
7. BATTLE, W. H. Some points relating to injuries of the head. Hunterian lectures at the College of Surgeons. *Lancet*, July 5 and 12, 1890.
8. MYGIND, HOLGER, Copenhagen. Contribution to the knowledge of hereditary syphilitic deafness. (Bidrag til Kendskabet til den heredosyfilitiske Dövhed.) *Nord. med. Arkiv.*, vol. xxvii., No. 7.
9. MÜLLER, JULIUS, Hamburg. Reading of deaf-mutes. Guide to the study of the art of lip-reading. Published by himself.
1. The attendance at the aural university clinic at Halle increased to 1623 patients, with 2014 different forms of diseases, of whom 179 were treated in-doors at the stationary clinic. Aristol and pyoktanin were given a careful trial. These new remedies were not found, however, to be worthy of recommendation. Chiselling of the mastoid process was performed in 62 cases. LUDEWIG fully describes the fatal cases (7). The third case of chronic suppuration with polypus and caries is of special interest, because the operation was the immediate case of death. After extraction of the malleus and incus the mastoid was chiselled. "At the depth of $1\frac{3}{4}$ cm. the middle cerebral fossa was opened, although the chisel was directed anteriorly and upward below the linea temporalis on a level with the spina supra meatus." In spite of immediate antiseptic dressing the patient died on the seventh day with symptoms of meningitis. At the autopsy a defect, the size of a pin-head, was found in the dura at a point corresponding to the trephined opening below which coagula and osseous splinters were found lying upon the bone. In the surrounding dura and pia mater intense redness and hemorrhages. In the temporal lobe

"an accumulation, about the size of a hen's egg, of soft, putrid, dark-red masses." No suppuration found in or about the brain.

RUMLER, Berlin.

2. HOFFMANN, at the Medical Society of Greifswald, reported thirty-five cases of middle-ear disease following influenza. They all turned out favorably without affecting the mastoid process. The discharge was mostly serous or sero-mucous, rarely purulent. In six cases both sides were affected simultaneously; in four cases ecchymoses and blood blisters were seen on the drum-head. In one case there existed besides the middle-ear affection empyema of the frontal sinus (diagnosed from frontal headache, pain on pressure upon the frontal region, and discharge of muco-purulent secretion from the middle nasal meatus after cocaineization of the nose). It healed in about two weeks, the nose being permanently treated with cocaine. From two cases examined bacteriologically, and from the clinical course of the disease, the author is inclined to believe that the latter is not produced by the hypothetical specific influenza bacteria, but by streptococci, the development of which is favored by the influenza infection.

ZARNIKO, Berlin.

3. SZENES gives an abridged review of all the papers which treat of aural diseases due to influenza. It was seen that the middle ear was the principal seat of the disease, which was of an acute catarrhal or purulent nature. The bacteriological examination did not prove the existence of a constant characteristic micro-organism in the tympanic secretions, but several were found which are known to occur also in small numbers in the ear under normal conditions. It seems at any rate to be justifiable to consider this form of otitis media as the result of infection. Szenes himself has observed 44 cases, among which were 3 with catarrh of the Eustachian tubes, 8 with "catarrhus cavi tympani acutus," 28 with acute inflammation of the tympanic cavity, 3 with acute eczema of the external meatus, 4 with periosteal phenomena at the mastoid process, which were relieved by energetic antiphlogosis and iodine applications.

KILLIAN, Freiburg.

4. LUDEWIG, in the cases observed at the clinic at Halle, found nothing characteristic of influenza. One fatal case: acute caries of the mastoid process, which ended fatally by pyæmia in spite of chiselling.

RUMLER.

5. SZENES discusses menthol, aluminium acetico-tartaricum, sublimate, aluminium aceticum, carbolic glycerine, creoline, iodol,

bismuthum salicylicum, aristol, boric acid, lactic acid, cocaine, and massage. We emphasize from the somewhat elaborate paper the following points: Menthol does not act as favorably in furunculosis as it has been asserted by Cholewa, but the treatment is convenient and worthy of recommendation. The author confirms the favorable action of aluminium acetico-tartaricum, sublimate, and aluminium aceticum in furunculosis, of carbolic glycerine at the initial stages of otitis media acuta. Iodol had, according to Szenes, no effect, the otorrhœa in some cases even being rendered more profuse. Aristol is to be recommended in affections of the external meatus, but rejected in suppurations of the tympanic cavity. Boric acid is a sovereign remedy in combatting suppuration of the middle ear, except chronic purulent inflammation of the attic. Massage relieves the pain in acute inflammations of the tympanic cavity and favors absorption.

NOLTENNIS, Bremen.

6. In consequence of Stilling's recommendation of pyoktanin, PATRZEK tried it in aural patients. He treated with the remedy one case of otitis externa acuta circumscripta and one of otitis media acuta purulenta, and also five cases of otorrhœa. The treatment lasted about two weeks. There was no marked improvement. The blue color of the drug prevents its general introduction into otology.

JENS, Berlin.

7. BATTLE, while in the main being in accordance with the view that immediate profuse and continued bleeding from the ear is an important sign of fracture of the middle cerebral fossa, emphasizes the fact that exceptional cases may occur, in which the fracture of the middle cerebral fossa is situated anteriorly to the membrana tympani, and leaves the hearing organ intact. The presence or absence of the bleeding is, therefore, not absolutely pathognostic. Battle, with reference to the watery discharge, is of the opinion that it is due to the escape of cerebro-spinal fluid. The prognosis of these cases is unfavorable, principally when complicated with otitis media of old standing. Battle lays some stress upon the importance of ecchymoses over the mastoid process, which point to the posterior cerebral fossa as the seat of the fracture; he thinks that they usually appear on the third or fourth day after the injury, and that the time of their appearance depends upon the distance from the seat of the fracture.

8. Symptoms characteristic of the disease were present as follows: Previous keratitis parenchymatosa, dental anomalies (Hut-

chinson), vertigo, staggering gait, dulness of the membrana tympani, tinnitus. Deafness appeared suddenly but in one case; in the others, however, it developed gradually, but quite rapidly. Treatment, local and general (with inunctions of blue ointment, injections of pilocarpine or strychnia) were of no avail. The author arrives at the conclusion that the affection was principally labyrinthine, and the affection of the middle ear was of secondary importance.

VICTOR BREMER.

9. This book of the teacher of speech has for its purpose to teach lip-reading to deaf persons by auto-instruction. The necessary systematic exercises are carefully given.

b.—EXTERNAL EAR.

10. BING, ALBERT, Vienna. Idiopathic acute periostitis of the external meatus. *Wiener med. Blätter*, 1890, No. 37.

11. EITELBERG, A., Vienna. Chronic circumscribed inflammation and polypus of the external meatus from pressure of a ceruminal plug. *Wiener med. Presse*, 1890, No. 39.

12. GRAHAM, H. Mucor corymbifer in the external auditory meatus. *Lancet*, December 27, 1890.

13. KESSEL, Prof., Jena. Foreign bodies in the ear. *Correspond.-Blätter des allgem. ärztl. Vereins in Thüringen*, 1890, No. 9.

14. HOWE, LUCIEN. On the removal of a bullet from the ear with the assistance of the galvano-cautery. *Trans. Amer. Otol. Soc.*, 1890.

15. HILDEBRANDT. Second case of injury to the bulbus venæ jugularis internæ by paracentesis of the membrana tympani. *Arch. f. Ohrenheilk.*, vol. xxx., p. 183.

16. An abscess formed in the external meatus with intense fever and pain, extending from the upper wall close to the membrana tympani, which was covered down to its inferior third. On the fifth day spontaneous opening of the abscess took place; recovery after three weeks. The hearing faculty was normal during the entire duration of the affection, but up to the recovery periostitic irritation had taken place in addition along the entire zygoma.

POLLACK, Vienna.

17. In a patient with pain in the ear for two months, a fluctuating and sensitive tumor, of the size of a pea, appeared at the antero-inferior wall of the external auditory meatus. The inner

portion of the meatus was filled with cerumen, after the removal of which a polypoid proliferation, which was 5 mm long, 3 mm wide, flattened, and highly red, appeared at the postero-inferior wall. The tumor at the entrance of the external auditory meatus disappeared after two days. The polypoid growth disappeared in three weeks after two cauterizations with chromic acid.

POLLACK, Vienna.

12. GRAHAM briefly reports an observation made in a young Moslem woman at Beirut (Syria). After removal of a plug the patient disappeared entirely from observation. The growth was found to be *mucor corymbifer*, and the diagnosis was confirmed by cultivation experiments. The fruit hyphae were colorless, the sporangia covered by a smooth-looking, transparent membrane; the sporangia leaves branched out in the usual umbelliferous manner; the spores were small, colorless, oval, and densely packed together.

13. KESSEL gives a description of the conditions relative to the removal of foreign bodies from the ear, as suited for the general practitioner. With reference to the removal by means of instruments, Kessel proceeds according to his own methods. If a foreign body is wedged in a perforation of the *membrana tympani*, the opening is extensively enlarged, and the foreign body is either pushed out by injections of lukewarm water through the Eustachian tube, or extracted by instruments. Kessel excises, if these are of no avail, the drum membrane and the *malleus* in order to facilitate the extraction. If this is without success, the tympanum is laid bare up to the *tegmen*. Kessel does not consider the ablation of the auricle as sufficient for the removal of a foreign body from the tympanum with a swollen external meatus. The chiselling of the posterior wall of the meatus up to the tympanum is not permissible on account of a possible injury to the facial nerve and to the horizontal semicircular canal. On account of an observation, in which during the extraction of a foreign body the *cutis* and *periosteum* of the postero-superior wall of the external meatus and a portion of the cartilaginous meatus was pulled off the osseous canal without occluding the entrance into the tympanum in the least, Kessel arrived at the conclusion, in case of an *indicatio vitalis*, to sacrifice as much of the soft parts of the meatus as is obstructing the access to the tympanic cavity.

14. In a case of a bullet impacted in the external meatus, HOWE used a platinum wire heated to such an extent that it

buried itself in the substance of the lead. When allowed to cool it was found attached to the bullet, and traction brought it near the outlet of the meatus. Two holes were then burned above and below on the surface of the ball, sufficiently deep to afford a hold for the teeth of the forceps, and by this means the extraction was completed.

SWAN M. BURNETT.

15. In this, as well as in Ludewig's case, the intense hemorrhage could be stopped by plugging the internal meatus. After recovery, which took place without reaction, a bluish-red bulging was observed in the postero-inferior quadrant, which was influenced by pressure upon the vena jugularis interna.

RUMLER.

c.—MIDDLE EAR.

16. KOEBEL, Stuttgart. Indiscriminate treatment with powders in suppurations of the middle ear. *Würtemb. Corresp.-Blätt.*, 1890, No. 26.

17. EDWARDS, W. J. Ear complications from chronic catarrhal inflammations of the nose and throat. *Four. Amer. Med. Asso.*, October 4, 1890.

18. LOEWE, LUDWIG, Berlin. Disinfecting tampons in the meatus. *Monatsschr. f. Ohrenheilk.*, 1890, Nos. 6-8.

19. LOEWENBERG, Paris. Contribution to the treatment of sclerosis of the middle ear. *Deutsche med. Wochenschr.*, 1890, No. 28.

20. Prof. BÜRKNER. On the misemployment of Politzer's method in the treatment of aural diseases. *Berliner klin. Wochenschr.*, 1890, No. 44.

21. GELLÉ. Otitis and facial paralysis. Hearing and facial paralysis; innervation of the tympanic muscles. (Otite et paralysie faciale. Audition et paralysie faciale; innervation des muscle tympaniques.) *Annales des malad. de l'oreille*, etc., November, 1890.

22. THIES. Two cases of necrosis of the cochlea. *Arch. f. Ohrenheilk.*, vol. xxx., p. 185.

23. LUDEWIG. Contribution to the knowledge of caries and extraction of the incus. *Arch. f. Ohrenheilk.*, vol. xxx., p. 263.

24. STEINTHAL, Stuttgart. The operative treatment of suppuration of the middle ear and mastoid process. *Würtemb. Corresp.-Blätt.*, 1890, No. 23.

25. HOFFMANN, EGON, Greifswald. Contribution to cerebral surgery. *Deutsche med. Wochenschr.*, 1890, No. 48.

26. PATTERSON, R. G. A contribution to the study of the intracranial complications of chronic otitis media. *Dublin Med. Four.*, July, 1890.

16. KOEBEL warns the general practitioner against the treatment with powders in suppurations of the middle ear, laying down the well-known principles for it. With reference to the powdered boric acid, Koebel agrees with Schwartze's views, but he also admits its use in acute suppurations, if the conditions are favorable to discharge, if no complications are present, and if the case is carefully watched by the attending physician.

ERHARD MÜLLER, Stuttgart.

17. EDWARDS reports cases of ear trouble associated with affections of the nose and throat, as follows: 1. Man of fifty, with fibromata in the nose with hardness of hearing, removal with galvano-cautery. Hearing restored. 2. Case of mastoid abscess associated with nasal catarrh of long standing. Mastoid opened. Patient recovered. 3. Catarrh of nose and throat of one year's standing, followed by acute otitis media and mastoiditis. Opened mastoid, evacuated pus. Patient recovered. 4. Fibroid polypi of nose associated with marked deafness. Removed them by Ronze's operation. Hearing restored.

SWAN M. BURNETT.

18. LOEWE's method of simply plugging the external meatus with cotton, formerly devised by him (*Monatsschr. f. Ohrenheilk.*, 1888, No. 10), is suited only for the treatment of serous catarrhs of the tympanic cavity, which are said to be cured thereby in from two to four days. In mucous and muco-purulent discharge Loewe proposes the following procedure: plugging with oiled cotton for twenty-four hours, irrigations, careful drying with cotton, insufflation of boric acid under strong pressure (double balloon), the tip of the insufflator being brought close to the perforation, in order to blow the powder into the tympanum and to form a veil-like lining; then plugging with dry absorbent cotton, which should be pushed through the perforation into the tympanum. In the beginning daily, then rarer, repeating of the procedure, until the discharge has disappeared and the mucous membrane of the middle ear has become pale. Loewe leaves the plugging for weeks in the ear, and afterwards finds at times old perforations closed. Besides this "disinfectant" plugging, he employs in affections of

the external meatus a "medicated" one—*i. e.*, he saturates the cotton with suitable drugs. When drying is expected, an oiled or collodium plug is placed on top of the other.

G. KILLIAN, Freiburg.

19. In view of the fact that in sclerotic affections of the middle ear the trouble may be aggravated by undue pressure from the air-douche, by tension of the drum membrane and the ossicular joints and bands, LOEWENBERG recommends the occlusion of the external meatus during inflation, causing the patient to press the finger firmly into the diseased ear, or even into both ears. In addition we may exert direct pressure by attaching to the rubber balloon two rubber tubes, which, inserted into one or both ears, exert, simultaneously with the inflation of air into the tubes, a pressure upon the external surface of the drum membrane. As to the drug to be applied, bromethyl has had no effect, according to Loewenberg; he employs iodine vapors, which are aspired into the rubber balloon from a bottle containing iodine. The patients suffering from sclerosis experience a sensation of warmth from the inflation of the vapors of ether, chloroform, and bromethyl, those with other aural affections a sensation of cold.

20. BÜRKNER warns against the indiscriminate use of Politzer's method by physicians and laymen, and justly prompts its restriction. "Politzer's method is generally indicated only in childhood, in the acute catarrhal affections of the middle ear, in suppurations of the tympanic cavity with perforations of the membrana tympani, and in chronic catarrh of the middle ear without sclerosis if both ears are implicated. In adults we decidedly always prefer the catheter, unless its employment is rendered difficult or impossible by local conditions or the general health of the patient."

RUMLER.

22. THIES makes from his cases the following inferences: 1. That total facial paralysis may be completely restored to normal conditions after removal of the cochlea and cure of suppuration (Case 1). 2. That the facial paralysis may persist after the casting off of cochlea and ceasing of suppuration (Case 2). 3. That in the diseased ear absolute deafness takes place. 4. That vertigo and subjective noises persist, although in less a degree.

RUMLER.

23. In a former paper (*Arch. f. Ohrenheilk.*, vol. xxix., p. 241), LUDEWIG reported 32 cases. At the examination of his operated cases after one year Ludewig found improvement of hearing in 16,

impairment in 3, and no change in 9 cases ; 4 cases did not undergo a re-examination. The final result, concerning the suppuration, remains unchanged. The number of cases has increased to 75. In the new 43 operated cases the result is therefore as follows : Suppuration cured in 22, not cured in 5, under treatment in 9, unknown result in 5, exitus lethalis in 2 cases. The condition of the ossicles was as follows : malleus normal, incus carious in 12 ; malleus carious, incus carious in 25 ; malleus carious, incus (?) in 2 ; malleus carious, incus normal in 1, extraction failed in 3 cases.

RUMLER.

24. STEINTHAL, after considering six histories of cases, discusses the indication for the operation. Steinthal is of the opinion that it is not popular enough and is frequently considered too dangerous. He agrees with the views of Küster and Koerner that the bone affection is more frequently the primary disease than has been heretofore supposed. He thinks this also to be the case in two of his cases, while the reviewer does not agree with this view. He lays down the rule that "in all cases of suppuration in which primary suppurative catarrh of the tympanum cannot be positively diagnosticated, the mastoid process should be opened when purulent discharge from the ear is present." Steinthal expects from the operation more rapid recoveries than heretofore, if it is undertaken in order to thoroughly remove the diseased bone according to general surgical principles.

ERHARD MÜLLER, Stuttgart.

25. Of the three cases two are of interest to the aurist. 1. Otitis media purulenta dextra, perforatio spontanea, empyema antri et cell. mastoid., pachymeningitis purulenta following influenza. After chiselling the mastoid process the osseous portions above the suppurating dura were entirely removed (about the size of a silver dollar). *An abscess in the cerebral substance of the occipital lobe was discovered*, which had not been diagnosticated before on account of the lack of characteristic symptoms. Drainage and plugging with iodoform gauze. Exitus : complete recovery in about nine weeks. 2. Extensive cholesteatoma of the mastoid process and of the adjoining parts of the occipital bone, extensive extradural abscess. Chiselling of the mastoid process, of the postero-external angle of the parietal bone, of a portion of the occipital bone with exposure of the transverse sinus. Exitus : Complete recovery, restoration of an approximately normal hearing distance.

ZARNIKO (Berlin).

26. In this paper an elaborate report of a fatal case is communicated, at the autopsy of which septic softening of the thrombus in the lateral sinus and subsequent detachment of emboli were found to have been the causes of pyæmia. PATTERTON calls attention to the variability of the location of the lateral sinus, and he believes that Barker's line ought to be raised fully three quarters of an inch higher than it has been recommended by Barker.

d.—NERVOUS APPARATUS.

26a. GRADENIGO, Turin. Subjective noises in otitis interna. *Allgem. Wiener med. Zeitung*, 1890, No. 36.

26b. GRADENIGO. Subjective ear noises in otitis interna. (I Rumori subiettivi del orecchio nell' otite interna.)

27. BUSS, G., Darmstadt. Contribution to the knowledge of aural affections in traumatic neurosis in consequence of railroad accidents.

28. GRADENIGO, Turin. Affection of the acoustic nerve in nephritis (Affezione del nervo acustico nella nefrite). *Il Sordomuto*, 1890, No. 5.

29. HABERMANN, J., Prague. Communication of cases: 1. Hemorrhages into the labyrinth in consequence of pernicious anæmia. 2. Hemorrhages into the labyrinth in consequence of ordinary anæmia. *Prager med. Wochenschr.*, 1890, No. 39.

30. OGSTON, ALEXANDER. On unrecognized lesions of the labyrinth. *Lancet*, July 19, 1890.

26a and 26b. GRADENIGO publishes the full history of an intelligent female patient with an aural affection associated with intense and distressing subjective noises, and adds some explanatory remarks. We emphasize Gradenigo's warning against an attempt to remedy the affection by means of Lucae's "tone cure" and Brenner's electric treatment, since his experience with both measures was of a very unfavorable nature. NOLTENNIS.

27. BUSS reports the history of a patient in whom, in consequence of a railroad accident, besides other severe symptoms of traumatic neurosis, various disturbances of the hearing organ developed. Buss states his views as follows: that the aural affection in traumatic neurosis depends upon a central disease, probably situated in the temporal lobe, with considerable diminution or destruction of the bone-conduction, based upon decrease

of the specific energy of the acoustic nerve as a partial phenomenon of a general nervous concussion. Diminution of hearing, appearance of tinnitus, vertigo, and headache are associated with it. The progress is unfavorable.

28. The case reported by GRADENIGO demonstrates the fact that in nephritis, as in cerebral tumors, changes in the peripheric terminations of the acoustic nerve may be present, corresponding to those observed in the terminations of the optic nerve. These may develop in the beginning without marked functional disturbances.

30. OGSTON, in this paper, draws attention principally to a condition which is not unfrequently observed in gouty and rheumatic persons, and which is principally characterized by the sudden appearance of deafness and tension in the ears, of tinnitus, and of disturbance of the musical sense; furthermore of a sensation of general uneasiness, which is greatly increased by sudden movement of the body. There exists but slight or no real pain, and the attack may gradually disappear in the course of a week, leaving slight diminutions of the musical hearing and a predisposition to new attacks. Ogston considers this condition to be analogous to glaucoma in the eye: he recommends absolute rest, firm plugging of the ears with cotton, and in some cases subcutaneous injections of pilocarpine. Some quite useful diagrams were exhibited and suggestions made with reference to the construction of maps for acuteness of hearing, referring to the principles laid down by Helmholtz and Donders for the examination of the eye. Some test maps were demonstrated.

e.—NOSE AND NASO-PHARYNX.

31. SCHÄFFER, Bremen. Abscesses of the nasal partition wall. *Therapeutische Monatsh.*, 1890, No. 10.
32. DIETRICH, JOSEPH, Elbing. Ulcus septi nasi perforans. *Mon. f. Ohrenheilk.*, 1890.
33. SCHMIEGELOW, E., Copenhagen. Cystopneumatik Omdunelse of concha media. *Ugeskr. f. Laeger.*, 1890, No. 9.
34. MEYJER, POSTHUMUS. The most common cause of nose-bleeding and its treatment (De meest voorkommende Oorzaak van Neusbleeding en hare Behandeling). *Nederlandsch Tijdschrift voor Geneeskunde*.
35. BONNE. Contribution to the treatment of certain chronic

nasal affections, with the use of galvano-cautery. *Therap. Monatsch.*, 1890, Nos. 8 and 9.

36. LÖRI. Contributions to the treatment of naso-pharyngeal and laryngeal diseases. *Allg. Wiener med. Zeitung*, 1890, No. 44.

37. HÖFFINGER. Vibration massage of the nasal and naso-pharyngeal mucous membrane. *Allg. Wiener med. Zeitung*, 1890, No. 44.

38. BLOCH. Mechanical aids to human breathing. *Wiener med. Wochenschr. a. ff.*, 1890.

39. WAGNIER, Lille. Caseous coryza. Cholesteatomatous rhinitis (Coriza caséous. Rhinité cholestéatomateuse). *Revue mens. de laryngologie, d'otologie, etc.*, 1890, No. 20.

40. ZIEM, C. Contribution to the diagnosis of nasal suppuration in general. Remarks upon the so-called Tornwaldt's disease. *Mon. f. Ohrenheilk.*, etc., 1890, No. 7.

41. BRESGEN. Further communications upon the use of pyoktanin (methylineviolet) in the nose and throat. *Therapeutische Monatshefte*, 1890, No. 10.

42. SCHEINMANN. Pyoktanin for tuberculous ulcerations in the larynx and in the nose. *Berliner klin. Wochenschr.*, 1890, No. 33.

43. BRESGEN. Dry treatment of the nose and its accessory cavities. *Berliner klin. Wochenschr.*, 1890, No. 39.

44. SCHÜTZ, G., Mannheim. Contributions to the knowledge of empyema of the antrum of Highmore. *Mon. f. Ohrenheilk.*, 1890, No. 7.

45. LICHTWITZ. The diagnosis of latent "empyema of the antrum of Highmore by means of the irrigation trocar." (Du diagnostic de l'empyème "latent" de l'antre d'Highmore par le lavage explorateur. *Bulletin Médical*, 1890, No. 86.

46. ZIEM. Translucidation of the antrum Highmori. *Berliner klin. Wochenschr.*, 1890, No. 36.

47. VOHSEN. The translucidation of Highmore's antrum and of the frontal sinus, and their affections. *Berliner klin. Wochenschr.*, 1890, No. 46.

48. SREBERNY. Contribution to the study of translucidation of Highmore's antrum in its empyema. *Berliner klin. Wochenschr.*, 1890, No. 46.

49. SCHÄFFER, M. Report of 1,000 cases of adenoid vegetations. *Wiener med. Wochenschr.*, 1890, No. 49 *a. ff.*

50. PATRZEK, OPPELN. Adenoid vegetations of the naso-pharynx in adults. *Deutsche medicinal Zeit.*, 1890, No. 75.

51. CALMETTES, R. and LUBETT-BARBON. (Nouveau procédé pour opérer les végétations adénoïdes du pharynx nasal chez l'enfant.) New procedure for operating on adenoid vegetations of the naso-pharynx in children. *Gazette hebdom.*, 1890, Aug. 20.

52. STEWART, W. R. H. Adenoid growths in the naso-pharynx. *Lancet*, 1890, Sept. 20.

53. MEDERNACH, W. Hypertrophy of the pharyngeal tonsil and its treatment. *Inaugural Dissertation.*

54. FELICI, FR., Rome. Rapid extirpation of a naso-pharyngeal fibroma. *Arch. ital. di Laringologia.*

51. SCHÄFFER in abscesses of the nasal partition wall recommends to combine with the incision the excision of an elliptic portion of the mucous membrane and perichondrium, then to scrape out the cavity with the sharp spoon, and finally to plug it with iodo-formized gauze.

NOLTENNIS.

52. DIETRICH derives the development of the simple perforating ulcer from the peculiar circulation of the mucous membrane of the cartilaginous septum, in which five arteries are concerned. In consequence of the numerous anastomoses the circulation is not rapid in the arteries of this part, and is even less so in the veins, which readily form varicosities and thus cause bleeding. Thrombosis of the varicosities may also develop, the extension of which leads to nutritive disturbances and finally to disintegration of the tissue. In this manner an ulcer develops, which bears a certain resemblance to the *ulcus ventriculi*. *Staphylococcus pyogenes aureus* and *streptococcus pyogenes* are not, as it is asserted by Hajek, the cause of ulceration, but later intruders.

G. KILLIAN.

53. SCHMIEGELOW describes three cases of formation of "osseous bulbs" in the *concha media*, two of which were in the right and one in the left nostril. The patients were females, 33, 40, and 46 years of age. The most prominent symptom is intense headache. The treatment consists in the operative removal by means of the galvano-cautery, scissors and forceps. In one case the microscopical examination of the inner wall of the cyst revealed ciliated cylindrical epithelium.

VICTOR BREMER.

34. After a brief historical synopsis MEYJER enters more fully into the etiology and diagnosis of epistaxis. The author agrees with Hartmann, Michel, Kiesselbach, etc., that in the greater number of cases the cause of epistaxis is to be looked for in the bursting of small varicose vessels at the septum narium, viz., anteriorly at the boundary between cartilage and bone. The author prefers chromic acid to all other remedies. He reports 25 tabulated cases treated with chromic acid, 23 of which were after one cauterization absolutely free from relapses. In one case epistaxis occurred later from the other nostril, but ceased after one cauterization. In one case there was a small vessel, which had not been cauterized the first time by the chromic acid, and which was the cause of a relapse.

JENS, Berlin.

35. BONNE uses, with good results, in chronic nasal swellings and their sequelæ and complications, injections of equal parts of tannic acid and glycerine, to be made two or three times a week. The author points out that this method is principally beneficial in country practice, since the absence of a specialist and of suitable instruments makes the rational treatment of these conditions impossible (thermo-cautery, galvano-cautery, cold and warm snare, etc.—REV.). Bonne insufflates by means of a small glass tube to which a rubber tube and a mouth-piece are attached. A few histories illustrate the statements.

NOLTENNIS.

36. The paper proves LÖERI to be a pronounced adversary to radical treatment in chronic nasal catarrh, in empyema antri Highmori, in tonsillar affections, in diphtheria, even in apparently benign laryngeal growths, in the latter "for well-known reasons." Compare the original as to the composition of tinctures, plasters, etc., used by Löeri, the employment of which presupposes a remarkable degree of industry and persistence on the part of the physician and patient.

NOLTENNIS.

37. Thirteen cases, treated by "vibratory massage," mostly of chronic hypertrophic rhinitis, which are said to demonstrate the excellent effect of this method of treatment.

NOLTENNIS.

38. There are according to BLOCH two kinds of respirators, oral and nasal, their transition being formed by the oro-nasal. Inasmuch as the only requisite is the cleansing of the inspired air from dust, etc., nasal respirators are perfectly proper; the oral ones are to be rejected as non-physiological. The nose, with its quadruple functions of warming the air, imbuing it with moisture, cleansing from dust, and warning against the inspiration of harm-

ful gases (eventually by the production of reflexes), is always the best respirator. If after restoration of the nasal breathing mouth breathing habitually persists, Guye's contra-respirator is applicable. Of the nasal respirators, those devised by Feldbausch principally for therapeutic purposes, and those by Wolff, especially as hygienic and prophylactic apparatus, are excellent and worthy of recommendation. The expense, I regret to state, of the "free-air breather," the "knapsack," and the "moustache—" respirator prevent up to date their extensive use, especially among the laboring class.

NOLTENNIS.

39. WAGNIER's patient, a woman, had suffered for three and a half months from nasal obstruction, when intense pain occurred in the right nasal region, together with purulent discharge from the right nostril and swelling of the hard palate, in which after two weeks two openings formed. The probe when introduced entered the nasal cavity. Right nostril swollen and obstructed; the probe reaches the left nostril through a perforation in the septum. After discharge of a large amount of caseous material from the right nostril the fistulæ of the palate and also the perforation of the septum healed.

40. ZIEM recommends irrigations through the nose with Mayer's force pump for the diagnosis of nasal suppuration, whether it has developed in the nose or in an accessory cavity. We may thus find pus in cases in which we could not find it by rhinoscopia anterior, nor by rhinoscopia posterior. Injections should be made at different hours of the day and on different days. Ziem argues against the objection, that from every nose, even the healthy ones, some matter may thus be removed, by stating that the normal nasal mucous membrane discharges only transparent mucus, and never "yellowish shining or even yellowish-green flakes of pus and lumps of connecting lamina and detritus." These injections may frequently be unsuccessful, for there are cases of suppuration of the accessory cavities which can be recognized only from the offensive odor, perceived by an expert, from the injected fluid. Stained fluids or turpentine when introduced into the antrum could not be demonstrated through the nasal injections. "Tornwaldt's bursitis" never exists alone. In a considerable number of cases, which were treated in vain by others for this affection, suppuration was demonstrated in the nose or its accessory cavities and cured by proper treatment.

G. KILLIAN.

41. BRESGEN has seen nasal wounds heal readily under treatment with pyoktanin, while he formerly frequently observed after operations severe inflammations with their sequelæ.

NOLTENNIS.

42. SCHEINMANN heats the thickened end of his flexible copper probe and takes up the pure pyoktanin cœrul. He rubs the covered probe energetically into the tuberculous ulcer. Scarcely any reaction occurs. Scheinmann reports two severe cases of nasal tuberculosis, one of which was cured six days after operative removal of the tumor-like infiltration, the other after eight days under treatment with pyoktanin.

RUMLER.

43. BRESGEN, according to Krause's recommendation, has during the last few years used dry treatment for nasal affections, and is satisfied with the results. He uses iodol for Highmore's antrum and frontal sinus, soziodolkalium for the interior of the nose and soziodolzink in ozæna.

RUMLER.

44. SCHÜTZ has observed three cases, in which, after extraction of a carious upper molar tooth, suppuration of the antrum Highmori developed in a formerly normal nose, viz., after one day, five days, and two weeks respectively. In the last fully reported case there occurred a few hours after the extraction of the tooth inflammatory symptoms, which pointed to an affection of the antrum maxillare.

G. KILLIAN.

45. LICHTWITZ distinguishes two forms of suppuration of Highmore's antrum : 1. the well-known form with the phenomena of retention of pus ; 2. the one associated with continued or periodical and intense discharge from the nose, which is by far more frequent and the knowledge of which is due to modern rhinology. The author considers the well-known diagnostic signs as unreliable. The only means of determining the diagnosis positively is the irrigation of Highmore's antrum. The author performs it by thrusting a very thin trocar from the lower nasal meatus into the antrum maxillare and connecting it with a syringe. He considers his operation as a "miniature operation" when compared with that devised by Mikulicz.

JENS.

46. ZIEM denies the great value of the method of translucidation for the diagnosis of affection of Highmore's antrum, which, after Voltolini's precedence, Heryng, Freudenthal, and especially Vohsen, would like to ascribe to it. On the other hand there is only one reliable means, viz., the exploratory puncture followed by irrigation.

RUMLER.

47. VOHSEN advocates the value of translucidation, and emphasizes its importance in affections of the frontal sinus, which present great difficulties in diagnosis. He believes that "translucidation surely permits the conclusion of the non-existence of an affection." Vohsen has no experience in the living.

RUMLER.

48. SREBERNY confirms, with four cases, the theoretical suppositions of Ziem, that slight suppurations of Highmore's antrum cannot be proven by means of translucidation. RUMLER.

49. SCHÄFFER distinguishes two kinds of hypertrophy of Luschka's tonsil: 1. Pedunculated tumors, 2. Smooth tumors with broad base like oral tonsils, with longitudinal sulci; the latter form being decidedly more frequent in North Germany. The bursa pharyngea (Tornwaldt) is in nearly all cases the recessus medius. Schäffer mentions, that he succeeds in most cases in removing the hypertrophic pharyngeal tonsil *in toto* with Gottstein's knife. This, however, does not refer to such large specimens (2½ to 3 cm long, 2 cm wide, and 1½ cm thick) as were observed by Schäffer, on account of the difficulty of introducing a Gottstein knife of corresponding size into the naso-pharynx of the mostly young patients. The complications referred to in this affection are of especial interest. Frequent epistaxis, development of goître, erysipelatous facial swelling, disturbances of speech, possibly also choreic convulsions, frequent and severe affections of the hearing organ, etc. (Compare upon this point the carefully tabulated statistics.) With reference to the diagnosis, Schäffer considers swelling of the mucous membrane of the nasal floor in its entire length as a wellnigh sure criterion, while the author has too low an estimation of the value of rhinoscopia anterior. In scrofulous patients Schäffer adds general treatment to the operative procedure.

NOLTENNIS.

50. PATRZEK reports four cases of adenoid vegetations in patients of from twenty-eight to forty-two years of age.

51. CALMETTES and LUBET-BARBON operate adenoid vegetations for the last ten months in bromethyl narcosis with a modified Gottstein knife. The narcosis is rapidly induced by strong doses and firm pressing of the mask against the face; no muscular relaxation occurs. When anaesthesia has taken place, they interrupt the narcosis. The instrument is rapidly introduced and the centre is cut off to the right and left. The patient soon awakens from the narcosis.

52. STEWART prefers Gottstein's ring knife, his own finger-nail, or Loewenberg's forceps modified by Woakes. He considers chloroform the best anaesthetic. The patient is placed in a perfectly straight position. Otorrhoea may increase after the operation, or an old one may reappear; a slight inflammation of the mastoid process may rarely follow.

53. MEDERNACH describes in his full and elaborate dissertation the operation of adenoid vegetations with Kuhn's forceps.

54. FELICI reports a case of naso-pharyngeal polypus, its pedicle springing from the roof of the naso-pharynx. He succeeded in removing the tumor *in toto* with the galvano-caustic snare.

FIRST MEETING OF THE NORTH GERMAN AURISTS IN BERLIN, APRIL 22, 1889.

Reported by ADOLPH BARTH, of Marburg, and translated by
Dr. J. A. SPALDING, Portland, Me.

On this day the first meeting of the aurists of Northern Germany took place in Berlin, GOTTSSTEIN being chosen president and BARTH secretary. The society resolved to become a permanent one, to meet every year, to invite all the aurists of the northern portion of the empire to join in the proceedings, to request the presence of ladies at the social meeting, to solicit without special invitation the attendance of foreign aurists, to meet for the purpose of advancing the science of otology and for friendly acquaintance, and to convene each year at Easter in Berlin.

PROCEEDINGS.

BERTHOLD spoke of the *Cicatrization of old perforations of the M.*, recalling his methods of myringoplasty suggested at Cassel in 1878, and reviewing the criticisms of other authors concerning the same. He felt dissatisfied with all that he had as yet accomplished in this province. Last year for the first time he had succeeded in improving his method of skin-grafting until he was now as positive of closing over old perforations, as of obtaining perfectly granulating surfaces on wounds on any other part of the body. After the suppuration has ceased, and he has loosened any adhesions between the edge of the perforation and the opposite wall of the tympanum, he places on the granulating mucous surface of the promontory a bit of skin precisely the size of the perforation, and of a thickness equal to the distance between the margin of the perforation and the inner tympanic wall. The surface of this skin as will be then seen fits into the margin of the perfora-

tion as a watch glass into the groove of the rim. The granulating mucous membrane affords the material for the nourishment of the transplanted skin, whilst the secretion which oozes out around the margin of the skin, ties the latter down to the edges of the perforation.

The hearing was not affected by this procedure, except to be improved in nearly every case.

The cornea of rabbits and the skin of frogs were also employed in these experiments, but without success. Transplantation with human cuticle proved successful in Berthold's hands in closing over the largest perforations, even to entire absence of the *Mt*.

When the perforations are very small and do not heal with human skin, the author resorts to the egg membrane, wetting it repeatedly with turpentine at intervals of several minutes after once laying it over the orifice of the perforation. This little procedure renders the membrane very transparent, so that we can see how the turpentine irritates the *Mt* and how the marginal growth extends and the perforation diminishes in size. Whenever the patient perceives the least pain from the application of the turpentine, the author ceases to moisten the graft and does not reapply the turpentine till the following day. This carefully followed up, irritation of the *Mt* gradually diminishes the size of the perforation until in a few weeks it is completely closed, whereupon the egg membrane is in its turn exfoliated.

During the discussion Berthold was asked at what period of the chronic suppuration he began to insert the bits of skin. The mucosa of the promontory generally granulated only so long as it suppurred, and after the suppuration was suppressed the mucosa was covered with epithelium and had ceased to granulate. It was impossible to understand how the skin could be transplanted during that stage. If, on the other hand, the mucosa were still secreting, a condition in the author's opinion indicating the very essence of the attachment of the graft, suppuration was still present and would inevitably prevent the adhesion of the graft. Other members spoke of the frequent diminution of hearing produced by all these methods of transplantation. Hartmann had seen extensive inflammation, Truckenbrod had accidentally had an opportunity to examine one of Berthold's cases a long time after the operation, and to satisfy himself of the successful result, though the perforation was not wholly cicatrized.

WALB read a paper on *The pars ossea of the external tympanic wall,*

and the great clinical and diagnostic importance of the alterations which take place in that region. Up to this time the appearances and condition of the *Mt* have solely been considered in making our diagnosis. This may be well enough for a *portion of the chronic cases*, but for all of the *acute* cases and a large portion of the *chronic* cases the condition of affairs at the pars ossea must be borne in mind. This region rises laterally from the margo tympanicus, which at the upper half of the *Mt* projects forward into the meatus, forming a broad semilunar surface. The gap between the margines *tymp.* is filled with this bony plate rising from the squamous portion of the temporal bone, and with the margo would form a perfect half-moon were it not for the Rivinian foramen. This bony portion of the external tympanic wall is the first to form the attachment of the *Mt* to the upper wall of the meatus, and on account of its importance deserves a special name.

The inflammatory alterations in acute inflammations of the *Mt* and tympanum are revealed earlier on the pars ossea than farther downward, owing to the fact that the vessels of the *Mt* lie in a gore running from above downward, and of course exhibit injection and swelling in the larger vessels higher up than farther below, where the network of vessels is so much more delicate. If we at this period in the disease examine the *Mt* we find but the slightest of alterations. Auscultation will now give the differential diagnosis between an otitis externa located in this region, or the momentary redness of a temporary injection. This condition of affairs becomes much more important for diagnostic purposes when an ear becomes once more affected with an acute inflammation of the *Mt* or tympanum in which an inflammation had been present in former years. For under such circumstances we often find the pars flaccida adherent to the neck of the hammer, as well as very tense folds arising from the short process. In such cases there will be no injection or swelling in the *Mt*, because the vessels in the cicatrix lying on the pars flaccida are either entirely empty or else diminished in calibre. If this is the state of affairs we shall see the injection and swelling on the pars ossea alone, and from here gradually making its way around the periphery of the *Mt*, without actually infringing upon its surface. Nevertheless we may here have before us the actual picture of otitis media acuta—constant, violent pain, feverishness, etc., etc. We are surprised that we discover no alterations with the mirror, we try to console ourselves with the idea of some incipient otitis externa,

and only after examining the tympanum do we get any clue to the exact state of affairs, in that paracentesis of the *Mt* releases a large amount of serous fluid and the urgent symptoms at once abate.

All that has so far been said refers to the *cutis* of this region, but the pars ossea additionally plays an important rôle in all cases of the so-called perforation of Schrapnell's membrane, since the latter is almost invariably connected with caries of the pars. We find large defects extending to the upper wall of the meatus, through which the entire cupola of the tympanum lies open to view, whilst in total loss of the membrane the head of the hammer is often seen lying free.

The pars ossea is also frequently the seat of exostoses, sometimes more than one, with similar growths in the meatus in front of the *Mt*, in the form of globules lying opposite one another.

In the discussion which followed, most of the members present agreed with what Walb had said, but they thought the name was hardly happily chosen, and that it would be difficult to separate the region anatomically from its surroundings.

HARTMANN presented a patient with *total adhesion of the soft palate to the posterior pharyngeal wall*, in whom an operation ten months before had resulted in a permanent artificial opening. The adhesions were due to syphilis. The movements of the palate had been but slightly disturbed, so that speech had remained perfectly pure. The operation consisted in freeing the spots of attachment, and suturing the margins. The introduction of firm foreign bodies to prevent reunion could not be borne by the patient. The opening remained sufficiently patent to allow respiration and removal of secretion from the naso-pharynx by hawking.

WALB mentioned several cases of extreme stenosis in the pharynx, with adhesions between the soft and the hard palate, and between the two latter and the pharynx, due to excessive and unskilful use of the galvano-cautery or Paquelin's cautery, both by surgeons and specialists in throat diseases. Pharyngitis granulosa cannot be cured in one sitting, without leading to contact and union of the cauterized surfaces.

HARTMANN then reported *an attempt to make an artificial opening in a case of congenital occlusion of the external auditory meatus*. The case was that of a patient, aged twenty, with an auricle well formed all but the helix. The tuning-fork test demonstrated that hearing

was present. A current of air could be heard forcibly entering the tympanum during catheterization. The auricle was loosened from its insertion and bent forward, and a respiratory pushed in, as is often done in cases of foreign bodies in the meatus. It was then discovered that the pars tympanica was entirely absent, and that the head of the inferior maxilla lay on the anterior surface of the mastoid process. Tampons pressed into the posterior wall whilst the mouth was shut could not be removed till the mouth was opened. The incision was sutured and healed by first intention.

The operation showed : 1. That in congenital absence of the external meatus it is not appropriate to undertake an operation at the spot where the meatus ought to be, on account of the danger of injuring the inferior maxillary articulation. 2. The presence or absence of the osseous meatus can most precisely and with the least danger be determined by loosening the auricle from its attachment in the manner sometimes necessary in removing foreign bodies from the meatus.

MOLDENHAUER, in the discussion, urged those present not to operate in cases of congenital occlusion of the meatus, because the tympanum, with its adnexa, is almost invariably deformed on such occasions. The prognosis and diagnosis depend on the condition of the face and jaw, which are developed simultaneously with the organ of hearing.

The remainder of the session was occupied with the demonstration of instruments (palate hooks, etc.) and anatomical specimens (contracted Highmore's antrum and some interesting rhinoliths).

REPORT OF THE SECOND MEETING OF NORTH GERMAN AURISTS, BERLIN, APRIL 7, 1890.

Translated and abridged by Dr. J. A. SPALDING, Portland, Me.

1. After transaction of business matters, the first paper was read by TRUCKENBROD : *Diabetes: a hitherto unobserved symptom of meningitis, especially in those forms originating in the ear.*

The history of the case was this : A young physician suffered from influenza and acute otitis media. Perforation of Schrapnell's membrane and of the *Mt*; paracentesis liberated a profuse serous accumulation. Cerebral symptoms severe, but remitting from time to time for several days. Opening of mastoid; cavity healthy. At the beginning of the fourth week sugar was discovered in the urine. Death on the twenty-fifth day from the beginning of the otitis, with all the symptoms of diabetes. The autopsy verified the diagnosis. In support of the cerebral origin of the melituria, Truckenbrod specially mentions that the fourth ventricle was filled with a sero-purulent liquid.

During the discussion BERTHOLD reported a case of severe otitis media in which sugar in the urine was not discovered in the acute stage of the otitis, but during the convalescence.

2. The next paper was by BERTHOLD on *The optical representation of the movements of the memb. tymp.*

It is well known that tense membranes are easily excited into vibrations by the sound-waves of the surrounding air. Thus if we hold a vibrating tuning-fork in front of a tense membrane strewn with sand, the sand will begin to dance. If we hold in our hand a ring across which a thin membrane has been tightly stretched, and then bring the ring close to a vibrating tuning-fork, we can distinctly feel the vibrations with the hand.

This experiment of J. Müller's proves that the vibrations of membranes easily extend to the firm bodies with which they may

be connected. The drum membrane of the human ear, owing to its form, propagates sound more efficaciously than any other membrane. For, as Helmholtz has shown, the resonance of curved membranes is immensely superior to that of those that are flatly stretched. For this reason then, the vibrations of the *Mt* will also easily extend to the annulus tympanicus within which it is spread. And this propagation of sound will in many instances be of great importance for the hearing, as I have suggested in my paper on *What can the human ear perceive without the stapes?*

While investigating the conduction of sound through the bones of the head, as far back as 1872, I succeeded in optically representing the movements of my own drum-head. For that purpose I made use of a short T-shaped tube, one end of which I fixed hermetically in the meatus, the second by means of a rubber tube I affixed to a gas pipe, and the third end was drawn out to a fine gas jet. A cock affixed to the rubber tube then permits the gas flame to be turned higher or lower at will.

The flame will burn steadily if not directly or indirectly agitated by waves of sound. But if with closed lips we produce a sound in the mouth so that the bones of the head resonate in sympathy, or if we press a large vibrating tuning-fork against the bones of the head, the vibrations will be transmitted to the *Mt*, and from that to the gas in the meatus, and thereupon the flame at the end of the T-shaped tube will begin to vibrate. The rapidity of the movements in the *Mt* will of course depend on the pitch of our own voice or on that of the tuning-fork employed. If it makes more than thirty vibrations a second, the gas flame will seem to remain at rest, because rapidly repeated impressions of light act on the eye like a constant illumination. Nevertheless this property of light can only prevent us from observing the rhythmically waving flame so long as the latter *constantly impinges upon the same spot in the retina*. But if we look at the flame whilst turning our head to and fro, or if we follow the reflection in a *rotating mirror*, various portions of the retina will be excited and the movements of the flame made visible; the steady flame revealing a band of light with two *straight* boundary lines, the agitated flame a band of light with *wavy* outlines, representing the optical picture of the vibrating *Mt*. These outlines must necessarily be small on account of the small excursions of the *Mt* when set in vibration by the waves of sound. I am not aware whether the precise extent of these excursions has yet been fixed, but Helmholtz has shown that the excursions of the

stapes in an air-tight meatus vary from $\frac{1}{8}$ to $\frac{1}{4}$ mm. Riemann on the other hand has proved that during the vibrations due to a faint sound the excursions of the stapes could not be recognized with the microscope. For these reasons it is plain that the excursions of the gas flame in the mirror in my experiments must be a largely magnified representation of the actual movements of the *Mt*. And now by mathematical calculation we may easily demonstrate that the excursions of this flame must be about one hundred times as great as the actual excursions of the *Mt* during vibrations produced by waves of sound. Thus only can we explain the possibility of optically representing to the naked eye the movements of the *Mt*.

This experiment is most beautifully seen in those persons who can voluntarily open either one or both of their Eustachian tubes, so that the intonation of their voice can pass directly through the tube as if through a hearing tube.

3. BARTH presented a paper on *The need of careful observation in testing the hearing*. Amongst other suggestions he urged that the same word should not be pronounced repeatedly, because it has been found that frequent repetition of any word causes it to become audible when not heard at first, and thus we gain a false impression of the acuteness of hearing.

4. In the following paper BARTH urged the use of hot-water irrigations (65° to 70° C. = 150° to 170° F.) in severe epistaxis, citing one or more cases subsequent to galvano-cauterization of the inferior turbinated bone. The author also mentioned a case of tamponage of the nostrils continued for twenty-four hours and terminating fatally with all the symptoms of meningitis.

During the discussion several fatal cases of epistaxis were reported, and the general opinion was revealed that in epistaxis, as in uterine hemorrhage, hot-water irrigations were of the greatest benefit.

5. HARTMANN exhibited a large number of preparations of the ridge- and thorn-like processes of the nasal septum, showing that they arise from a line running from the spina nasalis to the rostrum sphenoideum.

6. HARTMANN presented a patient in whom he had extended the opening of the mastoid into the tympanic cavity. A drainage tube had been introduced from the opening in the mastoid through the antrum and upper part of the tympanum out of the external auditory meatus. A permanent communication between the auditory canal, attic, and antrum had been the result, with entire disappearance of all the inflammatory symptoms.

7. Amongst the specimens and instruments exhibited at this stage in the proceedings we may call attention to a binocular mirror for examining the ear and pharynx.

8. TRUCKENBROD spoke of the great merits of the late Dr. von Troeltsch, and recommended the erection of a suitable monument to his memory at Wuertzburg.

9. STIMMELL read a paper on *Delstanche's method of straightening the deviated nasal septum*. It produces considerable purulent rhinitis but is usually successful in its aim, and is worth recommending to the profession.

10. HECKE details *Two cases of caries of the osseous wall of the lateral sinus*. In the first the external aspect of the bone was healthy. On opening the mastoid caries was found, laying the bone bare. Recovery. The second case, showing disease of the mastoid externally, was operated upon, but proved fatal, probably from thrombosis.

BARTH reported a similar case and spoke of the general management of acute and chronic mastoid disease. His remarks opened an extensive discussion of the subject which offered many details of interest but nothing essentially new to our readers.

11. MÜLLER, of Stuttgart read a paper on *The anatomy of the floor of the tympanum*, toward which he had turned his thoughts owing to the reputed case of injury of the bulbus venæ jugularis during paracentesis of the *Mt*. He made experimental paracentesis on one hundred macerated temporal bones in order to discover how such an accident could possibly occur. The position and form of the tympanic floor are chiefly dependent on the extent of the jugular fossa, which varies exceedingly. Sometimes it has bulged upward and worn away the floor, till it has produced an actual opening. Müller discovered in 100 specimens, 16 of bulging and thinning of the sulcus tympanicus and in 5 of these the floor was as thin as tissue paper. Two preparations showed dehiscence. These tests agree with Zuckerkandl's discovery of 19 curvatures of the fossa jugularis in 67 temporal bones, and with Toynbee's 25 defective floors in 1,000 temporal bones. When the excavation is well pronounced the fossa sigmoidea and the sinus transversus are protruded. Of the 16 preparations 12 were on the right side, and only 4 on the left, a fact previously noticed by other authorities.

12. HARTMANN brought the session to a close by exhibiting Zeiss' ear microscope, which undoubtedly reveals minute alterations in the *Mt*, but is not at present of any practical value.

REPORT OF THE SESSIONS OF THE OTOLOGICAL
SECTION OF THE TENTH INTERNATIONAL
CONGRESS AT BERLIN, AUGUST 4-10, 1890.

Reported by A. BARTH, and translated by Dr. J. A. SPALDING, Portland, Me.

August 4th.—LUCAE, President.

I. ZAUFAL reports on the relations of micro-organisms to inflammations of the middle ear and their complications. The organisms that may excite these types of inflammation of the middle ear are the diplococcus pneumoniae of Fraenkel-Weichselbaum, the streptococcus pyogenes, the staphylococci albus and aureus, and the bacillus of Friedlaender. Others are more or less doubtful. The various micro-organisms do not produce any especial morbid symptoms, whilst the complications depend on local and anatomical opportunities. It is probable that even the healthy tympanum contains germs. The infection generally depends on transmigration from the naso-pharyngeal space, especially after operations, no matter whether accompanied with abundant or slight hemorrhage, whilst in other cases the infection seems to follow the vascular circulation. We do not know all of the causes which make an inflammation chronic, though secondary or tertiary infection plays a possible rôle. Many cases are probably due to diminution of the strength of the virulence by the contest between the tissues and the various medications employed, so that a prolonged duration of the morbid process is thus facilitated. In conclusion, Zaufal tabulated all the micro-organisms discovered in chronic middle-ear suppurations, but insisted on a scientific demonstration so far as the actual aetiology is concerned.

August 5th.—DELSTANCHE, President.

Moos resumes the topic left unfinished at the previous session, taking up *the paths of invasion* by which micro-organisms enter

the middle ear ; also *haemogenous congenital otitis media* and the same *after birth*, which arise from participation of the lymphatics, especially in the infectious diseases.

A second path is through the tube *directly or indirectly*, through the juice-clefts in scarlatinal necrosis of the pharyngeal tissues, avoiding the pharyngeal ostium.

Still another path is through the *previously intact Mt* (Moos observed this occurrence in erysipelas) as well as through the same when perforated. Finally the microbes may reach the middle ear from the cranial cavity, through the fissura petrosquamosa. The dural processes act as intermediators (as *e. g.* in epidemic cerebro-spinal meningitis), yet bacteriological proof is still lacking.

Moos further discussed all of the complications of suppurative middle-ear diseases—erysipelas, facial paralysis, meningitis, cerebral meningitis, thrombo-phlebitis, pyæmia (its origin, the various micro-organisms which play a rôle in this process). Many different organisms may be present at the same time, yet the lion's share in the disease falls to the streptococcus pyogenes.

In conclusion he described particularly tuberculous otitis and miliary tubercle.

In the discussion the question arose whether the middle ear might not become infected through the tubes by the medication employed, but no decided opinion was offered confirmatory of such a view.

2. *Cholesteatoma of the ear* by KUHN. Case of a man with acute disease of the middle ear. A large pearly tumor which had eroded the inferior maxillary articulation, sigmoid sinus, and posterior cerebral fossa.

After a critical review of all the articles on this topic published within the last ten years, Kuhn came to the conclusion that the pearly tumor of the ear is either a *genuine heteroplastic neoplasm* (Virchow), or that in a few rare cases of chronic aural suppuration, the *epidermis of the perforated Mt*, or of the *external auditory meatus* extends into the bony cavity of the middle ear, and forms stratified tumors by persistent exfoliation of horn-cells.

BEZOLD thought that these tumors were not to be regarded as specific tumor-formations, nor the product of an inflammatory process, but rather as a curative process, and deserving the neutral name of a "desquamative process." They are not only a result of former suppurations, but of catarrh, especially of the tubes. The treatment is not more unfavorable than in middle-

ear suppurations, but it generally lasts longer. Still we more often see the hyperproduction of epidermis permanently cease.

Amongst various remarks in the animated discussion following this paper, Barth suggested renewed investigations, to see if cells which cover a surface whether of ecto-, meso-, or endo-thelial organs can under certain circumstances degenerate epidermically or not. Zaufal thought that such experiments might be made on animals.

August 5th, P.M.—MCBRIDE, President.

3. HESSLER inquires: *Whether the opening of the mastoid process from the meatus can be regarded as of equal value with the usual methods.* He thinks that in every case we ought to begin with Schwartze's method, and then according to Bergmann to chisel the bone forward over the meatus, and to remove the posterior and superior walls of the meatus, the farther the suppuration and caries have extended over the squamous portion of the bone.

4. *After-treatment of the chiselled mastoid process*, by KRETSCHMANN. If suppuration is still present the incision is not sutured, but simply tamponed. The first bandage remains six days, on the average. Afterwards it is renewed every two or three days, the opening cleansed with disinfecting lotions, and, if the suppuration still persists, the tympanum is cleansed from the tube by means of the catheter. Where there is danger of the disinfecting lotions being swallowed, solutions of common salt should be substituted. The incision should not be permitted to cicatrize till the suppuration has entirely disappeared for several months.

5. STACKE read a paper on *The indications for excising the hammer and anvil.* The operation, together with a possible excision of the *M'*, is advisable in all obstacles to conduction this side of the stapes. It is not advisable in sclerosis. It is of the greatest importance in diseases of the ossicles and of the surrounding tympanic walls, even in cases of cholesteatoma. The subsequent amount of hearing is on the average rather greater after the operation than less. In many cases Stacke circumcised the auricle, and then, after crossing the meatus obliquely and removing the hammer and anvil, he chiselled away the upper and posterior wall of the meatus, so that the tympanum became accessible and the tegmen was laid bare. Suture of the auricle and drainage follow the operation. When the antrum is involved, a sound is passed into the aditus, and under its guidance chiselled open. The results are reported to be good.

LUDEWIG mentioned that in two cases of extraction of the hammer and anvil he accidentally removed the stapes ; no fever followed.

6. SEXTON read a paper on *Excision of the drumhead and ossicles*. His experience and views are published in the previous number of these ARCHIVES.

August 6th, Morning Session.—POLITZER, President.

7. STEINBRÜGGE: *Pathological anatomy of the labyrinth*. After description of the methods of investigation, the author passes to Ménière's disease, which has no typical form. He speaks of infection and the subsequent alterations, and the condition of the parts in constitutional diseases. The pathological alterations in the cochlea are most often discovered *in the inferior convolutions*.

8. *General discussion on the prognosis and treatment of progressive deafness in chronic non-suppurative otitis media*. The first speaker, MCBRIDE, subdivides the cases into those purely catarrhal, those that are non-catarrhal (inherited, rheumatic, and nervous), and the syphilitic. The former are the most amenable to treatment. There are plain indications for inflation and bougeing in a number of cases, as well as the need of particular attention to the naso-pharynx. In other cases there is but little if any chance for improvement. In cases of nervous origin, the bromides are excellent.

GRADENIGO's paper on the same topic has already appeared in the previous number of these ARCHIVES. As none of these cases are of an infectious nature, the treatment must consist chiefly *in excitation of the vitality of the parts involved*.

August 6th, Afternoon Session.—GELLÉ, President.

9. KIRCHNER: *On the origin of cholesteatoma of the temporal bone*. He explains the great tendency to relapses by the impossibility of removing all traces of the disease by operation or treatment. He has found the tumor deeply proliferated in the Haversian canals. (Microscopic preparations.)

10. The same author spoke of an *extravasation in the chorda tympani*. The preparation shows an extravasation in the nerve-sheath of the chorda tympani in diphtheritic inflammation of the tympanum.

11. KATZ : *On the histology of the cochlear canal with microscopic specimens.* The ligamentum spirale, being so rich in vessels, must have the power of contraction and expansion, without the assistance of the cochlear muscle. The epithelial layer of the stria vascularis, so well defined at first, but afterward so closely united with the underlying vascular layer, makes us think that there is such a thing as a vascularized epithelium.

12. DRAISPUL : (a) *On the anatomy of the Mt.* The membra propria of the *Mt* is a continuation of the periosteum of the annulus tympanicus. (b) *On the development of the malleo-incudal articulation.* The embryo of swine exhibits, on the articular surface of the hammer, a process which corresponds to an excavation in the anvil. As development proceeds this process loosens itself from the hammer and unites with the anvil. This union often ensues without the preliminary loosening, so that swine seem to stand in the middle between the animals in which a malleo-incudal articulation always exists, and those in which both ossicles are united into one.

13. POLITZER : (a) *On the cholesteatoma question.* Demonstration of several specimens where the epidermis of the *Mt* or meatus passes through perforations into the middle ear, where the cholesteatoma almost always arises. The important point to the author is whether the tube is open or not. Three specimens of cholesteatoma in the external meatus with enlargement of the calibre of the passage. (b) *Pathological anatomy of the ear.* 1. Two preparations from deaf-mutes, with ankylosis of the stapes and posterior upper wall of the pelvis ovalis, and atresia of the round window. 2. Right pyramid of a deaf person with columella formation. The stapedius muscle is absent. 3. A specimen showing cure of suppuration in perforation of Schrapnell's membrane. Politzer will study this case before he can make up his mind to favor removal of the ossicles. 4. Two specimens showing adhesions of the *Mt*, with simultaneous mobility of the stapes. (c) A new ear catheter, with an *oval orifice* in order to fit better into the orifice of the tube. *He also recommends the adoption of a unit for the size of Eustachian catheters.*

August 7th, Morning Session—GRUBER, President.

14. KESSEL : *On anterior tenotomy.* Introduction contains notes on the acoustic perceptions in their various relations: intensity, pitch, resonance, and final transmission of the irritation

to the terminal organs of the labyrinth. The importance of undisturbed function by the muscles of the middle ear for the normal transmission of sound is clearly emphasized, and from that the following indications are advanced for the performance of the tenotomy : (1) In paralysis of the *musculus stapedius* and impaired function of the *tensor tympani*; (2) permanent spasm in the *tensor*; (3) perforations of the *Mt*, in the region of the light spot; (4) catarrh with swelling. The indications under 3 are particularly important to investigate.

Sclerosis ankylosis and nerve atrophy are contra-indications.

15. *Statistics of ear diseases.* Opening of the discussion by BUERKNER, who exhibits his schemata and statistical reports of his clinique. JACOBSON argued on the inefficiency of the schemata, which do not permit any direct comparison of the various reports. A committee was appointed to investigate the whole question.

16. SCHWABACH : *Tests for hearing and the proposed unit for the indication of deafness.* None of the instruments so far produced can be regarded as a reliable unit because every one gives one-sided results. Tests with the whispered voice are rejected and Wolfe's method recommended. Edison's phonograph is useless as a test of the hearing. In order to gain an approximately safe diagnosis of the probable locality of the deafness it is necessary to consider the history, the objective condition, the clinical course, and the results of the tuning-fork tests. A reliable test is the duration of perception on the bones of the head. Magnus was of the opinion that Knapp's suggestion of a fraction with 100 as the denominator and the distance heard as the numerator was the best so far suggested. Magnus also preferred the spoken voice to the whisper, and urges the adoption of some unit. The denominator of the new fraction could be easily ascertained by testing several people with normal hearing.

17. GUYE : *On the aetiology of tympanic inflammations caused by syringing liquids through the nostrils.* Syringing into the nostrils should never be attempted till the surgeon has convinced himself of their permeability. If this is unsatisfactory, the simple pouring of fluid into the nostril may be permitted. Even if the nostrils are perfectly permeable, the nozzle of the syringe should never be pushed in so far as to fill the orifice hermetically.

18. BERTHOLD : *Myringoplasty.* This is to be attempted only after all pathological processes in the tympanum are healed. If the margin of the perforation is cicatrized it should be freshened

with a minute knife. Human skin or the membrane of the egg can be used. If the defects are large or total the transplantation should be carried over to the mucous membrane of the middle ear; the meatus is then to be filled with boric acid. The cure is permanent and the hearing, in a large percentage of cases, is improved.

19. GIAMPIETRO: *Diagnosis and cure of otitis suppurativa chronica.*

20. *Deaf-mutism in Norway.* Statistical paper.

21. *Deaf-mutism in Denmark.* Since 1817 compulsory education of deaf-mutes. For the year 1886, 0.64 per cent. of the people are deaf-mutes. The sexes are about equally divided. There is greater frequency of deaf-mutism in those provinces in which epidemics of scarlatina or meningitis have raged. Deaf-mutes do not marry so often as those who can hear. Their marriages are almost always sterile. When only one of the married couple is a deaf-mute, there are less number of children than in couples with good hearing. But it is worth mentioning that *none of the children of these latter marriages were deaf-mutes.*

August 7th, Afternoon Session.—ZAUFAL, President.

22. GELLÉ: (a) *Otitis and facial paralysis.* Out of thirty-one cases of facial paralysis which were examined particularly for their possible connection with inflammations of the ear, the author discovered that the connection actually existed, especially when peculiar pains and vertiginous symptoms were present, even if no direct middle-ear disease could be demonstrated. The condition of the middle-ear muscles and of the hearing during the disease is described. The treatment is antiphlogistic, as usual in inflammation of the middle ear. (b) *Audition and facial paralysis.* In contradistinction to the cases just depicted, Gellé saw a case of central total facial paralysis with normal hearing. There were many symptoms of paralysis of the tensor tympani; the function of the stapedius was intact. No hyperæsthesia, no pain, no vertigo, no subjective noises. (c) *Presentation of various instruments.*

23. BEZOLD: *Demonstration of means for testing the hearing.* Our most common tests for hearing do not suffer in comparison with Snellen's tests of the amount of vision. Speech is the most perfect test for defining the perception of sounds. The author uses eight different tuning-forks with movable weights, and three organ pipes which give a constant series of tones.

24. SHIRMINSKY : *A new method of maintaining patency in artificial perforations of the Mt.*, consists in only once touching the edges of the artificial opening with chromic acid. It never closes afterwards.

25. BISHOP : *Atresia of the external auditory meatus.*

26. BOTEY : *Experiments on the removal of the stapes in animals.*

These experiments and a case in a patient prove that the evulsion of the stapes in animals is free from danger. An occlusive membrane is always subsequently formed. All of the animals heard after the operation. Animals from whom the entire sound-conducting apparatus had been removed, but who still possessed the oval and round windows, hear better with similar circumstances than those with ankylosis of the stapes. If we excite a slight inflammation of the promontory so that externally no stapes ankylosis arises, we find the ankylosis deeper in. If Botey's results are confirmed by other observers and if the results of the operation are always so favorable in mankind, it would be regarded as a great advance in the treatment of ankylosis and middle-ear sclerosis, which the author compares with the cataract of the eye.

August 8th, Morning Session.—SEXTON, President.

27. GRADENIGO : (a) *The auricle in the insane and in criminals.* It is oftener and at the same time more considerably deformed than in other persons. If only one auricle is affected it is generally the right, but the left stands off from the head the most prominently. (b) *On the morphology of the anti-helix in man.* See the previous number of these ARCHIVES.

28. SECCHI : *Experimental investigations into the physiology of the middle ear.* Chiefly on the determination of and variation in the endo-tympanal pressure. The author promises full details in later papers. Some symptoms incline him to believe that the waves of sound are conducted, *not so much through the ossicles as rather from the Mt. to the round window according to Pascal's theory.*

29, 30, and 31. Papers on *aural affections during and after the influenza.* Nothing particular in the general type and course of such a middle-ear disease, except that very rarely we meet with one or two cases with severe symptoms, such as abundant hemorrhage, followed with well-marked sequelæ and complications, whilst these are followed with a long run of very mild cases.

32. LUCAE : *A new hearing trumpet.*

33. WEGENER: *Schwartz's method of treating cholesteatoma*, which consists chiefly in formation of a skin flap and subsequent treatment with an iodoform oil emulsion.

34. VOHSEN: *On the operative method in otitic cerebral abscess. Case of otitic cerebellar abscess with a specimen.*

35. KAISER: *Diplacusis.* There are two forms: D. dysharmonica, and D. echotica. A case of the latter variety is reported. The tinnitus and diplacusis disappeared after several catheterizations. D. dysharmonica is explained by false attuning of the membrana basilaris. The D. echotica may be due to prolongation of the tone, with retarded perception in the central organ, or to prolonged nerve conduction.

36 and 37. SEXTON and LUCAE: *Exhibition of new instruments.*

38. CHOLEWA: *A new palate holder.*

REVIEW.

Prof. Dr. STEINBRÜGGE: **The Pathological Anatomy of the Hearing Organ.** (No. 6 of the Text-book of Special Pathological Anatomy by Prof. Orth.) Berlin, 1891: August Hirschwald. Pp. 125. Reviewed by A. KUHN, Strassburg. Translated by Dr. MAX TOEPLITZ, New York.

The steadily increasing number of pathologico-anatomical investigations of aural affections, and the variety in their results, prompt the authors of extensive pathologico-anatomical text-books to confide the critical analysis of this material to the best-adapted representatives of otology.

In the year 1878 Hermann Schwartze first published in Klebs' text-book of pathological anatomy a systematic treatise of the pathological anatomy of the ear. Ziegler for his text-book of special pathological anatomy (1886) has intrusted our colleague Wagenhauser with the elaboration of the subject of the ear, and this work also owes its origin to the pen of an aurist, "because the study of this special province is out of the daily working field of the pathological anatomist."

These words, uttered by Orth, the excellent anatomist of Göttingen, give not only great satisfaction to the aurist, after the general undervaluation shown heretofore to our special science, but they acknowledge also the work done during the last twenty years—almost exclusively by aurists in the province of pathologico-anatomical examinations of the ear. If we compare Schwartze's book with this work, we are struck principally by the fact that so much, and especially that so much good work, has been done in our province in the brief period of twelve years.

In addition to the numerous papers upon the pathologico-anatomical changes of the ear, contained in Schwartze's book, which on account of the large experience of the author was very

complete for that time, a further number of investigations have been published in the last decennium, to which Steinbrügge has given full justice with critical precaution and based upon his own studies.

It is not my task to discuss the single chapters of a pathologico-anatomical text-book, but I will emphasize only the most excellent part, treating of the anatomical conditions in diseases of the labyrinth. Steinbrügge has for years proven by his papers that he "has penetrated and is fully conversant with this extremely difficult province," and, like a few others, has been enabled to give us a concise and clear picture of the known anatomical changes in the nervous apparatus of the hearing organ.

It is obvious from the great difficulty of the finer anatomical examination of the inner ear, that not very long ago by far the greatest number of functional disturbances of the hearing organ were considered genuine diseases of the middle ear. The technique of the histological studies of the normal membranous labyrinth, which has been greatly improved during the last fifteen years, enables us to demonstrate and appreciate the pathological changes of the inner ear.

The author, therefore, is justified in placing the fact in the foreground, that the labyrinth is implicated in many cases of diseases of the middle ear, especially in those following infectious diseases and nutritive disturbances due to alteration of the normal composition of blood. These changes in the inner ear do not appear in the form of microscopic and extensive destructions of the membranous structures, but only as labyrinthine hyperæmia and microscopic extravasations of blood.

Such aural apoplexies may develop from sudden aërial rarefaction in the external ear, and the sudden absolute deafness of those who for years have been more or less hard of hearing on account of chronic middle-ear affections is to be explained by similar hemorrhages in the labyrinth and in the cochlea.

Besides these hyperæmiae and extravasations of blood consecutive to middle-ear affections, Steinbrügge describes the well-known primary and homogeneous changes of the inner ear in disturbances of circulation, gravidity, leukæmia, traumatisms, etc.

In the labyrinthine inflammations from various causes the author finds the necrosis of tissue and the suppuration resulting therefrom, and also the consecutive reactive new formation of vascular connective tissue and of bone to be homologous to the

tympanal anatomical changes in inflammations of the middle ear. This is apparent principally in the acute inflammations of the inner ear in consequence of cerebro-spinal meningitis and of diphtheria ; similar observations have been made by Steinbrügge in a case of osteomyelitis, and, in accordance with other authors, in tuberculosis, syphilis, and leukæmia.

Furthermore, all these labyrinthine lesions, with reference to their connection with the middle ear, are especially discussed. Just in these chapters we find many new and interesting observations.

It may suffice to point this out and to intimate to our special colleagues that Steinbrügge has provided us for this heretofore obscure province of the affections of the inner ear with all the facts which can be given in the present state of science. For the microscopical examinations of the osseous and membranous labyrinth the author instructs us about the most appropriate methods of decalcification and preparation, the practical value of which have been tested by many of us. They require, I regret to say, too much time.

The numerous studies on the occurrence of micro-organisms in particular aural affections are exhaustively considered, and their connection with and influence upon the morbid processes clearly criticised. The book, clearly written and well gotten up with many excellent microscopical drawings, is a magnificent guide to those who intend to make a special study of the pathological anatomy of the ear ; it will be, however, of great benefit also to the expert on account of its completeness and its criticisms.

MISCELLANEOUS NOTES.

August 4, 1890, at which date the International Medical Congress and its otological section were opened, by a peculiar coincidence also the twenty-fifth anniversary of the appointment of Prof. LUCAE, the introducing president of the section, at the University of Berlin as Lecturer in Otology took place. At the request of Prof. GRUBER the assembled aurists celebrated this event at that opening meeting by an ovation. Furthermore, it was resolved to present LUCAE in commemoration of that day with an album containing portraits of all the members of the

section, and the execution of this idea was intrusted to JACOBSON, who had been LUCAE's assistant for many years. The presentation took place on January 4, 1891. At the desire of Dr. JACOBSON, who was, I regret to state, prevented by a death in his family from being present, Dr. DENNERT and Dr. JANSEN, the oldest and youngest assistants, and also the undersigned as secretary of the section, presented Prof. LUCAE at his residence with the album, a masterpiece of modern industrial art, containing portraits of almost all the members of the section. Dr. DENNERT expressed in eloquent words the veneration of the colleagues for LUCAE and his work in otology. In conclusion he wished that LUCAE might be spared to celebrate his fiftieth anniversary as lecturer with equal mental vigor. In his answer LUCAE, after heartily thanking the Society, said : Twenty-five years ago, it was a daring attempt to devote one's self to otology, since one ran the risk of being considered a charlatan by the laity as well as by the physicians. At that time one man had always inspired him with new hope when courage had left him, and this was RUDOLPH VIRCHOW. Although otology to-day holds a position co-ordinate with the other branches of medicine, many questions are still to be solved, and he promised, as long as possible, to do his share of investigation and labor.

DR. KRAKAUER.

BERLIN, January 5, 1891.

ERRATUM.

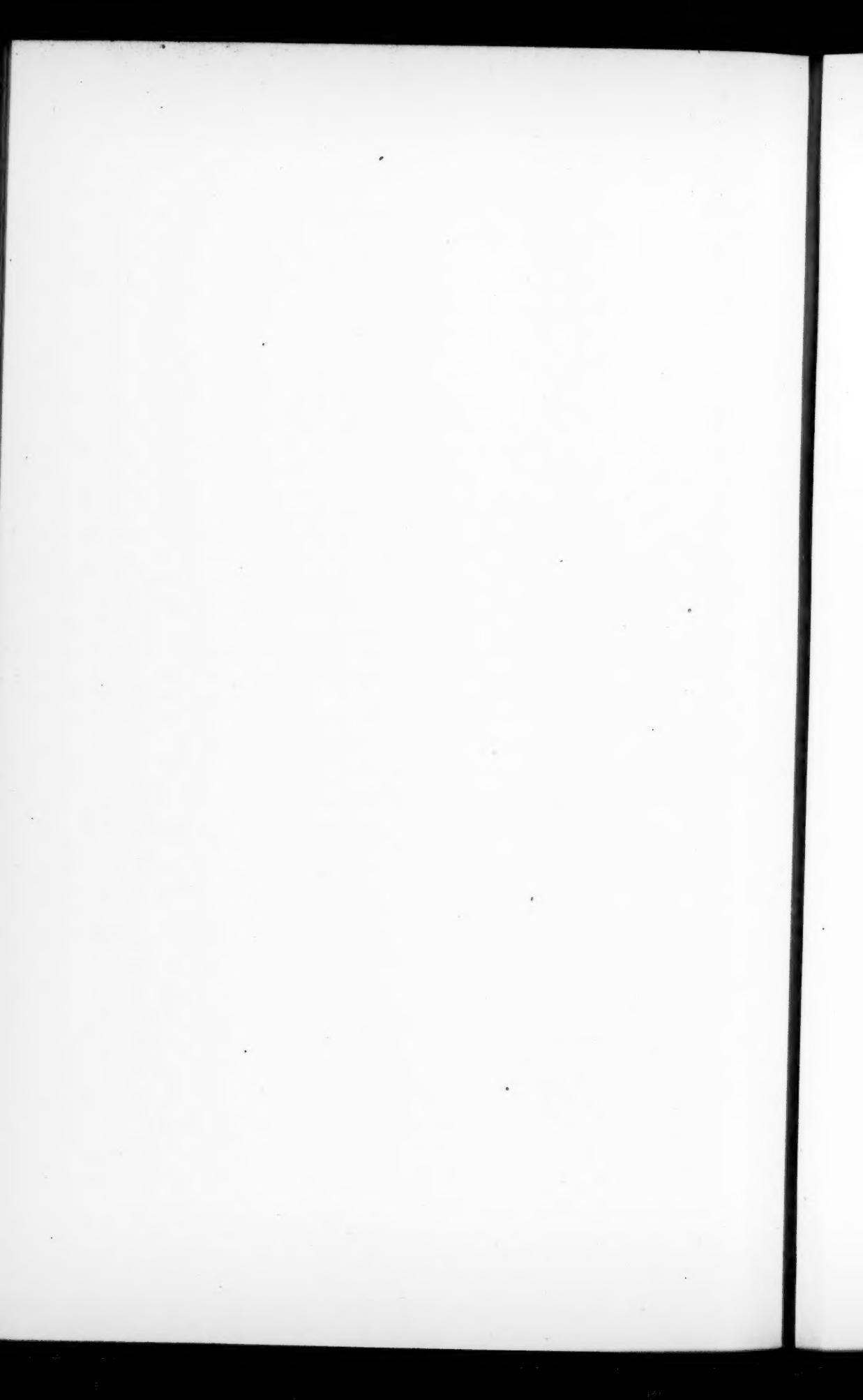
Page 60 of this volume, line 13 from above : *favoring*, instead of *due to*. [In very young children the ossification of the nerve canals is frequently not yet completed.]

ANNOUNCEMENT.

OWING to the steady increase of important contributions (freely illustrated by numerous wood engravings and superb lithographic and colored plates) which have been accepted for publication in the ARCHIVES OF OTOTOLOGY, the Publishers find themselves compelled to raise the annual subscription price from \$3 to \$4. The latter is the price at which the German edition, though costing less money to produce, has been issued ever since the separation of the ARCHIVES OF OPHTHALMOLOGY AND OTOTOLOGY into two independent periodicals. No reduction can be afforded to subscribers taking the two journals, ARCHIVES OF OPHTHALMOLOGY, and ARCHIVES OF OTOTOLOGY, and the subscription for the two will be hereafter \$9 a year. The increase in price will go into effect January, 1892.

G. P. PUTNAM'S SONS, PUBLISHERS.

SEPTEMBER, 1891.



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